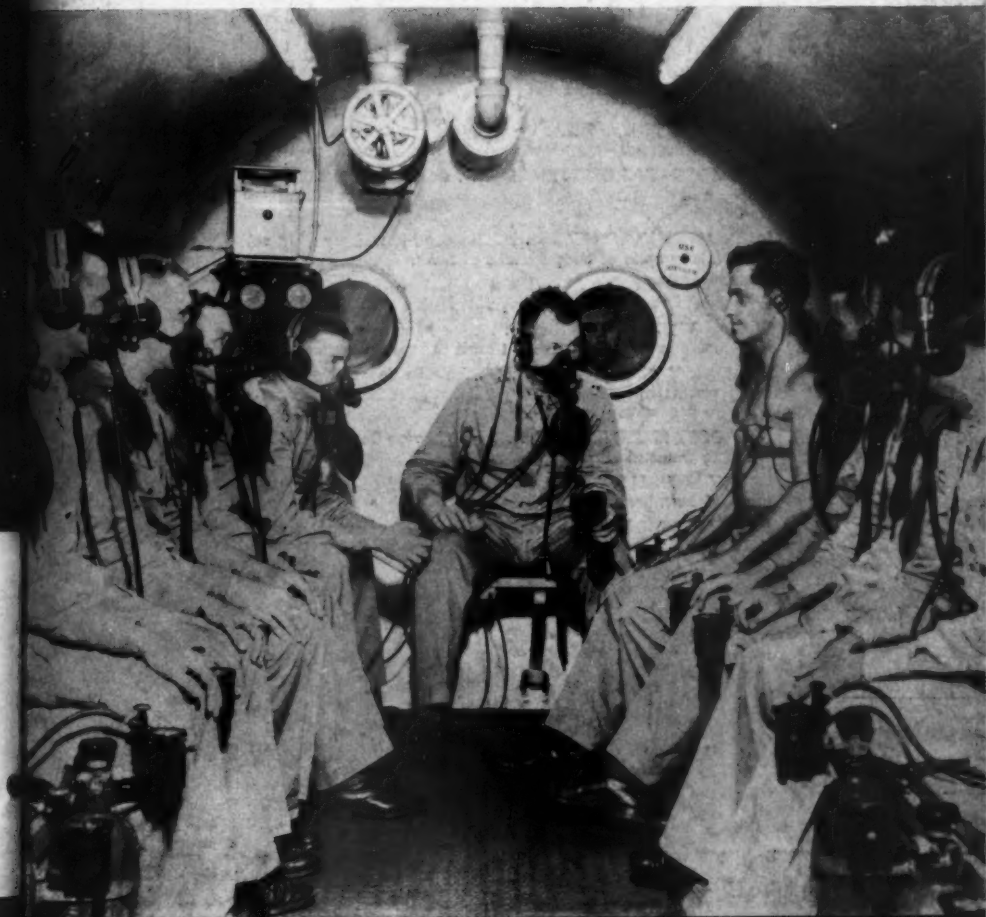


# ed Refrigeration Service Engineer


VOL. 11 NO. 9

★ ★ ★

SEPTEMBER . 1943



# 9 POINTS OF SUPERIORITY



1. **TRIPLE PROTECTION** . . . against leakage is assured by forming of a perfect seal at both front and rear of the compressor shaft.
2. **SELF ADJUSTING SLEEVELOCK** . . . this exclusive feature utilizes both spring and sleeve to assure perfect sealing even on bent or scored shafts.
3. **SELF-ALIGNING TO SHAFT** . . . designed to make perfect self-alignment automatic in spite of irregularities of shaft.
4. **SECONDARY SEAL** . . . in the seal plate and around the self-adjusting sleeve is extra insurance against leaks.
5. **FLEXIBLE IN APPLICATION** . . . on a bent or scored shaft, or a slotted shaft a Chicago Seal will adjust itself to requirements for perfect sealing.
6. **POSITIVELY SLIP-PROOF** . . . Chicago Seals will not slip. Precision-built compensating friction ring fitted against the shoulder of the shaft, locks seal securely in place.
7. **LOW COST MAINTENANCE** . . . all Chicago Seal parts are replaceable, assuring unusual economies of maintenance.
8. **EASILY INSTALLED** . . . the ease and speed of installing Chicago Seals means faster, lower cost installation.
9. **LONG SERVICE LIFE** . . . during this period of material and labor shortage, this feature becomes all important.

## Chicago Seals



*Refrigeration Engineers Are the Conservators of the Nation's Food Supply*



**CHICAGO SEAL CO.** 20 North Wacker Drive, CHICAGO, ILLINOIS

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**MR. DILL      MR. KEARNEY      MR. PORT**

**MR. WEDGE**

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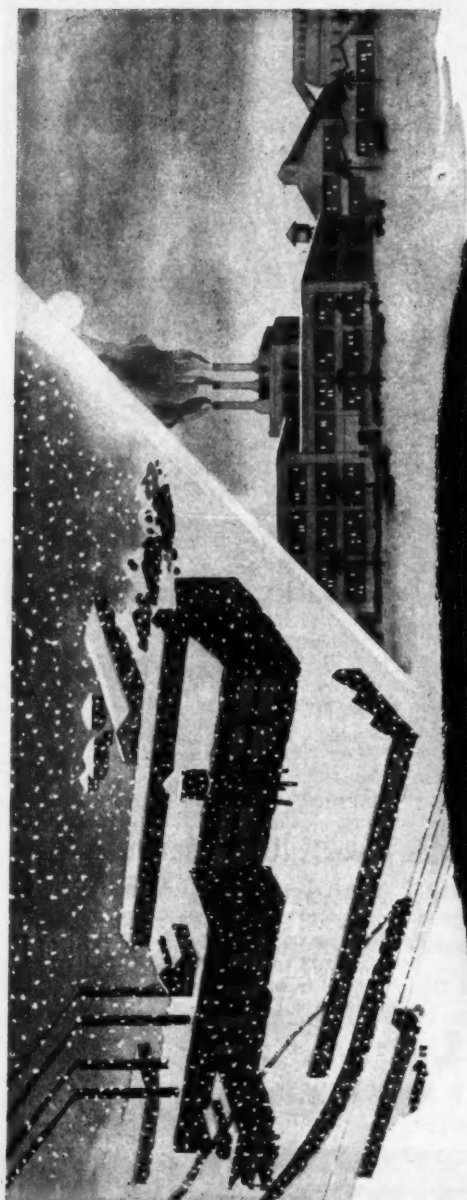
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RES-38

**TWENTY- EIGHT YEARS OF KNOWING HOW**



*When icy blasts grip the North—  
the sun still shines in the South*

September, 1943

2

THE REFRIGERATION

WITH war production geared to such a tremendous pace, the millions of factories located in every corner of the country. Revenues made in the winter cold these factories such accuracy and dovetailing of these far-flung manufacturing industry helps in all-out war production



**W**ITH war production geared to such a tremendous pace, the millions of factories located in every corner of the country. Bearings made in the winter cold of Detroit, or Boston, or Minneapolis, have to fit the delicately balanced crankshaft of an engine that may be made in sunny Mobile, or Dallas, or Los Angeles.

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Without the help of air conditioning in

these factories such accuracy and dovetailing of these far-flung manufacturing industry helps in all-out war production by making possible the country-wide fabrication of all these precision parts and contributing in large measure to the vast amounts of material flowing from the Nation's production lines.

Detroit Expansion Valves, Solenoid Valves, and Controls have been the standard of the refrigeration industry for many years.

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To maintain this rate of production will require the return of every "Freon" cylinder the moment it becomes empty. So—return your empty "Freon" cylinders NOW! By doing that you'll protect yourself and help maintain delivery of "Freon" for essential civilian requirements.

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**NOTE:** WPB is conducting surveys in several cities to determine why "Freon-12" cylinders have not been returned more promptly. Should these surveys show diversion of cylinders to other uses, action will be taken against those responsible.

# FREON

REG. U. S. PAT. OFF.

*safe refrigerants*



"Freon" is Kinetic's registered trade mark for its fluorine refrigerants.

**BACK THE ATTACK . . . BUY ANOTHER WAR BOND THIS SEPTEMBER**

How Your **KEROTEST** Valves

*Are Serving America's  
War Effort*

## War Refrigeration Equipment



Fresh provisions are vital to the health and morale of America's fighters—and we are proud that Kerotest Dependable Refrigeration and Air Conditioning Valves have been selected for and are daily contributing to the health and comfort of America's victorious sailors and soldiers on every front.

★ ★ ★ ★ ★ ★



# Valves

**KEROTEST MANUFACTURING COMPANY**  
PITTSBURGH, PENNSYLVANIA

# How Long Is an Inch?



*One of a series of actual photographs taken in the Alco plant*

## It used to be "one thumbnail-breadth"!



**Designers  
and Manufacturers  
of Engineered  
Refrigerant  
Controls**

The modern marvel of interchangeability of parts and mass production methods would be impossible with the old variable inch — for years described as a "thumbnail-breadth." Less than a hundred years ago metal parts made in the same shop attained some degree of interchangeability, but not with parts made elsewhere.

Not until the first World War did universal precision gaging come into its own with the perfection of finely lapped and seasoned steel gage blocks, accurate to millionths of an inch. Such blocks are used to check working and inspection gages of all kinds, jigs, and machine set-ups.

Both "Jo-Blocks," illustrated above, and Hoke Blocks are used in the Alco plant to maintain fine precision in the making of Alco Valves. Such accuracy assures precise valve performance, dependability, and long life. Furthermore, replacement parts, if needed years later, are sure to match the original fit.

**ALCO VALVE COMPANY—857 Kingsland Avenue, St. Louis, Missouri**

# You're Certainly Coming Through In a Pinch!

and we know it isn't easy

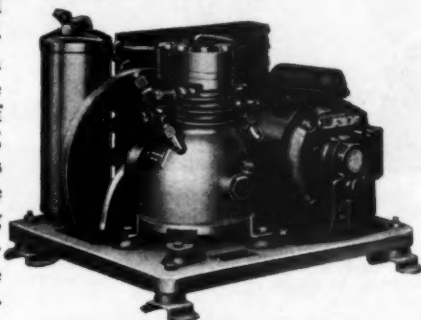
**N**O, it's not easy to keep worn out refrigeration equipment running smoothly these days in the face of labor and material shortages. But your customers know what a fine job you are doing . . . how your hard work and ability are helping war production and food preservation. You're certainly coming through in a pinch—and your own skill and resourcefulness deserve all the credit.

We hope that you are getting a helping hand, though, from the tough, long-lasting construction of G-E refrigeration equipment. G-E "Scotch Giant" condensing units are built for hard, continuous service—and their high quality is paying out now under wartime conditions.

It makes a good combination, we think—your ability and G-E performance. It's a combination that ought to mean plenty of post-war business for both of us—for the contacts you are making will give you a fine opportunity to suggest future installations of G-E equip-

ment. Don't overlook these possibilities. After the war, commercial and industrial refrigeration will be moving into plenty of new fields—be ready to move with it!

*General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 3719, Bloomfield, New Jersey.*



There's a full line of "Scotch Giants" from 1/6 to 125 hp—for low temperature applications down to minus 130 degrees F—in single or multi-stage systems.

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Hear the General Electric Radio Programs: "THE HOUR OF CHARM," Sunday 10 P. M. E W T, N B C . . . "THE WORLD TODAY" News Every Weekday 6:45 P. M., E W T, C B S

**GENERAL  ELECTRIC**  
**"Scotch Giant" Condensing Units**

# IMPERIAL

## *Data Sheets*

### 5. BENDING TUBING

THE next essential step in working tubing is bending or forming the tubing to the proper shape for the particular use for which it is being prepared. There are several methods for bending tubing.

Small tubing can be bent easily by hand without the use of tools. However, it is usually pos-



Using an external bending spring for bending copper tubing.

sible to make better bends, without risk of collapsing the tubing, by using one of the many bending tools.

One of the simplest tools for bending tubing is the bending spring. These springs are made in two forms—one an external bending spring and the other an internal bending spring.

The external bending spring is slipped over the outside of the tubing and the tubing is then bent, the spring preventing the tubing from collapsing and also keeping the operator from bending the tubing too sharply.

*This is the third of a series of Imperial data sheets published in the form of advertisements presented by Imperial as a small contribution toward the problem of handling service work under wartime conditions.*

In using the internal spring, the spring is inserted inside of the tubing, which prevents the tubing from collapsing when it is bent. It is well to remember when using bending springs that the tubing should be bent a little farther than is required and then backed up to give the desired bend. This loosens the spring so that it can be removed readily.

There are other very successful hand bending tools especially designed for making coils. They are made to take several different sizes of tubing by merely changing the mandrel and shoe.

Other tubing benders are available which are known as open side benders. These can be used to make bends at the end or any part of the tubing. They are especially handy where tubing has been partially connected.

Some of these benders have long handles so that it is possible to get plenty of leverage, especially when working with large size and heavy gauge hard tubing.

It should be remembered that in bending or working tubing, particularly copper tubing, the tubing will always harden as it is worked. You should be pretty sure just where you want to make the bend before starting out, because if you have to straighten the tubing out again and then rebend it, the tubing is liable to become hard and will have a tendency to collapse. If it is necessary to straighten the tubing out, a good practice is to anneal it before rebending.



An open side type of hand tube bender produces uniform bends without danger of collapsing the tubing.

THE IMPERIAL BRASS MFG. CO., 1204 W. Harrison St., Chicago 7, Ill.

# IMPERIAL

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STRAINERS • DEHYDRATORS • VALVES • FITTINGS • FLOATS • CHARGING LINES  
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G LINES  
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# ★ APPROVED FOR NAVY, MARITIME COMMISSION AND ARMY USE

## VALVES



**Balanced-Action  
Diaphragm  
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Type 626**



**Semi-Steel  
Flanged  
Globe Valve  
Type 223**



**Wing Cap  
Valve  
Type 203**



**Relief Valve  
Type 541**

**Snap-action  
Diaphragm**



## STRAINERS



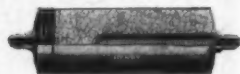
**"Y" Strainer  
Type 895**



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# HENRY VALVE COMPANY

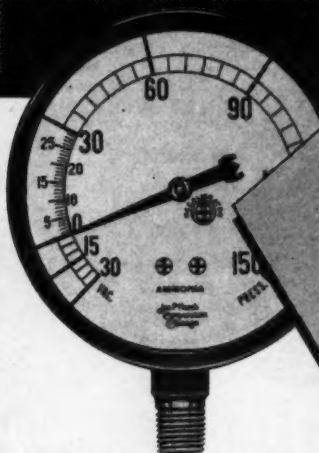
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SERVICE ENGINEER

9

September, 1943

# The "RECALIBRATOR" means accuracy is locked in for keeps



The "Recalibrator" is available in all Marsh Gauges, standard in all Marsh Dial Thermometers. Look for it. And look for the same kind of advanced features throughout the broad Marsh line.

**T**HERE was a time when gauge accuracy had to be measured in terms of "how long" — how long before the gauge is knocked out of adjustment and real accuracy becomes just a memory.

That picture changed with the advent of the "Recalibrator". For here at last is a simple, completely satisfactory way to correct a gauge — the mark of a

gauge or dial thermometer that can be kept accurate always.

The name tells you how it differs from ordinary "adjustments". It actually recalibrates the gauge by restoring the proper relation between the bourdon tube and the movement — makes the instrument accurate again at all points on the dial.

**JAS. P. MARSH CORP., 2059 Southport Ave., Chicago, Ill.**

# MARSH

*Refrigeration Instruments*



## AVRGAIRE

### Saves Food for Fighting America

Strength for the battle of production must come from wholesome food on the tables of our war workers. The supply of meat is critically short of the needs—which means that merchants should take every possible means to prevent spoilage.

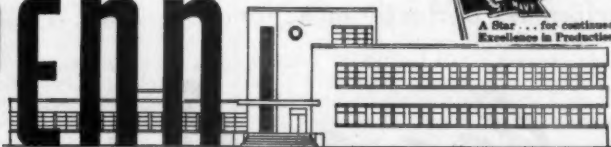
Penn's Avrgaire control is designed for all "above-freezing" applications in walk-in coolers and reach-in refrigerators. Its "cold anticipation" feature holds temperature closely at

the desired level...maintains correct humidity to avoid dehydration, or sliming. When the box is under an exceptional load Avrgaire delays defrosting until proper cooling temperature is restored.

Ask your jobber now for Avrgaire controls—they'll help you in the important job of keeping present equipment operating efficiently.

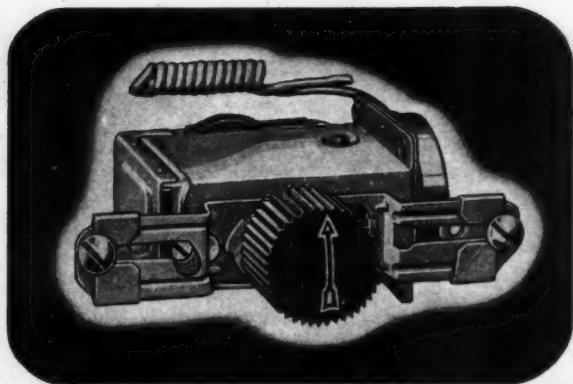
*Penn Electric Switch Co., Gosben, Ind.*  
In Canada: Powerlite Devices, Inc. Toronto, Ont.

# PENN



## AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS



## REPORTS FROM THE FRONT

Reports from actual engagements provide valuable lessons for troops that have not yet seen action. They are used to build better fighting units.

At Ranco, we realize the value of "reports from the front." Our field reports of units in service provide the information we need for the improvements that keep Ranco controls performing perfectly in action.

*Ranco Inc.*

COLUMBUS, OHIO

# The Refrigeration Service Engineer

Vol. 11

No. 9

*September, 1943*

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ  
REFRIGERATION SERVICE  
ENGINEERS SOCIETY

## *The Cover*

A detail of air force cadets taking altitude test in low pressure air conditioned chamber at Maxwell Field, Alabama. Story on page 28.

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# KEEP 'EM RUNNING

**T**HE old story of "a stitch in time" never had greater application than today... so important is the need for keeping all existing equipment running.

While practically 100% of Weatherhead facilities are devoted to production for Victory, we appreciate the fact that the home front is vital also, and as far as possible we are supplying this front with parts, fittings and accessories—to keep refrigeration equipment running. Call on us for what you need. We cannot make long-range promises, but will do our best to take care of your requirements.

**THE WEATHERHEAD CO.**  
300 East 131st Street  
Cleveland, Ohio



*Refrigeration Valves, Fittings and Accessories*



# The Refrigeration Service Engineer

Vol. 11, No. 9

CHICAGO, SEPTEMBER, 1943

\$2.00 Per Annum

## How to Eliminate Starting Trouble in Delco Capacitor Motors

—Use the “Bell” or “Skillet” to Control Starting Circuit

The author contributes this simple remedy of a common trouble to the Service Pointers Section with this explanation: “I hope I have made myself clear in this description. I shall be glad to answer any questions.

By Albert H. Sallee\*

ABOUT four years ago, Frigidaire units began to come equipped with Delco dual voltage capacitor type motors. Up until that time this type of motor had not been used very much on commercial units of more than one-third horse power.

During the next two years, we installed a large number of machines in our territory using this type motor. They began to cause trouble from the very first. On some machines we had to repair these motors as often as every two or three months. We even sent them back to the factory for repairs but they still would not hold up. We almost came to the conclusion that these motors were not suitable for commercial applications; especially those that had to operate on a comparatively short cycle. In fact, we did replace several of them with new repulsion-induction motors.

However, this trouble was not confined to commercial sizes. We have also had a great deal of the same trouble with the same type motor installed on domestic machines. Especially those installed in the 1936 and 1937 Kelvinators, using the automatic reset thermotron overload protectors.

### Motor Refuses to Start

In almost every instance, we found that the motor refused to start because the starting winding was not in the circuit when the motor stopped. If we turned the motor over by hand, it would usually start, but if it stopped at a certain place, the bell or skillet would fail to make proper contact. When this happened, the motor would only hum until the thermotron disconnected the power, and would keep this up indefinitely.

After worrying over this for almost two years, my brother and I decided to see if

\* Sallee Bros. Refrigeration Service.

we could find out why this condition existed and if we could do something about it.

As you know, there are two contacts on the starting switch. Since they are in series, both contacts must be closed in order for the starting circuit to be closed. Upon examination, we invariably found one of the contacts badly burned, and the other in very good condition. This indicated that only one of the contacts was actually breaking the circuit when the switch opened. Since the contacts are in series, the one which opens first is the one which bears the brunt of the arcing. It is the lower of the two or the one which still has an air gap when the other is closed if the "skillet" is depressed gently by hand. It is obvious then that the lowest point is the one which will be burned. As the motor starts and stops, and the arcing takes place time after time always in the same place, the low point gets lower and lower until finally the other point is so much higher that it prevents the skillet from touching the low point. At this time we get a rush call for service.

### Adjusting the Switch

We tried to remedy this by carefully adjusting the switch so that both points opened at precisely the same moment. This, we hoped, would equalize the load between the two points and they would at least burn down together and last longer. We were only moderately successful in this. For one thing, an adjustment of this nature would have to be too precise. It would be like trying to balance a pin on end.

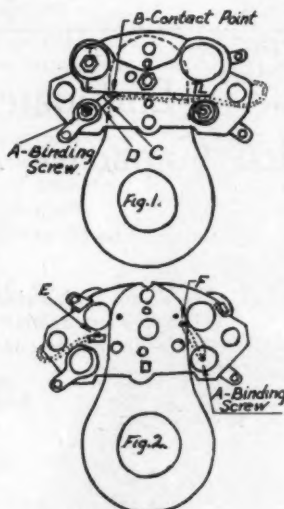
We came to the conclusion that the only way to end this difficulty would be to change things around so that instead of the first point to break getting all the work, it would be borne by the last to break. This way the high point would burn down until the two were precisely equal, at which time the load would be divided evenly between the two and further burning of either would be almost entirely eliminated.

We started making this change almost two years ago. Since that time, we have applied it to all motors of this type which we are called upon to service, with complete success. Some of them are still running perfectly after about eighteen months.

In a very few words, we have merely changed the hook-up so that instead of the two points being in series, they are in parallel.

To accomplish this, it is first necessary to

break the connection between binding screw A in Fig. 1 to the contact point B. I usually do this by removing the binding screw, scoring the metal of the connector at C with a small hack saw and breaking it off. Before breaking it I swing it around so that the small piece remaining attached to the point itself is easily accessible to soldering an insulated wire shunt to it. Trim off the end of the connector at D and reassemble under the binding screw as before. Make the motor lead connections to this exactly as usual.



Figs. 1 and 2—Diagram showing changed hook-up for Delco motors.

Solder a piece of insulated wire to the piece of the connector that is still attached to the contact point as shown by dotted line. Run it around the end of the thermotron and solder it to connection E on the back, Fig. 2. This connects the two points together.

From a pair of old motor brushes take two or three strands of the flexible copper shunt about an inch or so long. Solder one end of this flexible stranded wire to the under side of binding screw A and the other end to the skillet at point F. This wire must be large enough to carry the entire starting winding current and yet flexible enough not to interfere with the normal movement of the skillet. Do not use too

much wire at this point (i.e., not too long) because if a loop is formed there is some likelihood of its getting tangled with the armature.

Since the skillet is supported on rubber grommets, there is no danger of grounding the circuit.

I had a little trouble at first in getting solder to stick properly to the metal of the skillet. I now use stainless steel liquid soldering flux and ordinary 50-50 solder with perfect results.

In further reference to the word "strand" as I used it, each brush shunt contains perhaps six or seven "strands," each containing about nine or ten tiny individual wires. Three of these strands have proved sufficient for a one-half horsepower motor. In smaller motors one or two strands are enough. I believe it makes for greater flexibility if the strands are not twisted. See Fig. 2.

No allowances need be made in the number of strands used for either 110 or 220 volts as the current flowing through the starting circuit is the same on either hook-up.

These sketches and directions are for those motors which have the thermotron and switch points incorporated in one assembly.

For motors that have the thermotron separate from the starting switch the procedure is basically the same, except that the two contact points can be shunted with a much shorter piece of insulated wire.

Dual voltage reversible type motors without thermotron protectors present a much more difficult problem. It is necessary to drill a hole in the bakelite between the contact points and install an extra binding screw, the head of which will be under the skillet and to which the flexible lead must be attached. Other than that it is no more complicated than the others. These motors are not nearly so numerous, however, and I believe that with a little thought it should not prove to be too difficult to hook up.

\*\*\*

One No. 2 tin can yields enough tin for one type of hand grenade, but another type—the much-used fragmentation grenade—requires the tin from 54 tin cans.

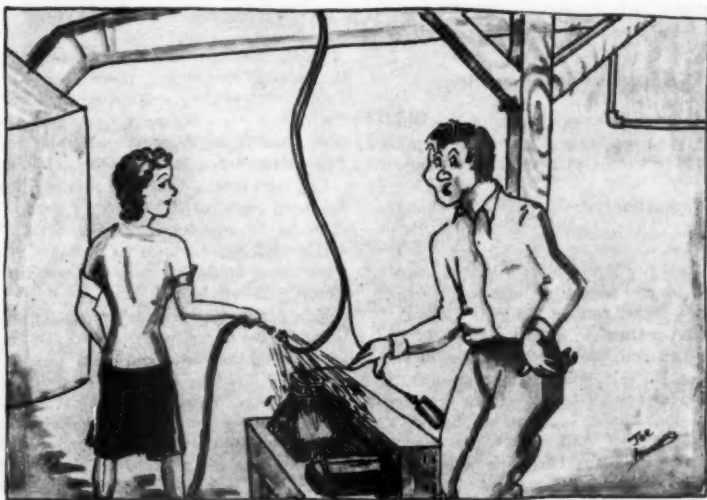
\*\*\*

Alvin Beck,  
Camp McCain, Miss.

"Send me your monthly magazine as I think it is a part of a service man's tools—just as necessary as a compound gauge."

---

*Yes, I Thought I'd Give it a Good Cleaning up  
While You had it Torn Down!*



# The Dual-Temp System

This is an explanation of the Stewart-Warner Dual-Temp refrigeration cycle as contained in their new Service Manual covering the 1940, 1941 and 1942 models, as well as other Stewart-Warner refrigerators manufactured in those years. This valuable guide to servicing the radically different Dual-Temp will be mailed free of charge to the first thousand readers of this publication who send their requests to Stewart-Warner Corp., 228 N. LaSalle St., Chicago, Ill. Please indicate whether you have ever serviced any Stewart-Warner Dual-Temp refrigerators.

THE Dual-Temp system is similar to an ordinary conventional capillary tube system, except that another cooling coil and a special valve have been added to provide two temperatures.

This valve is known as a DPC valve (differential pressure control). It causes the pressure to drop 20 pounds as the refrigerant passes from the cold plate (top compartment cooling coils) to the freezing locker coils. It thus maintains a constant temperature difference since the temperature of the liquid refrigerant always depends on the pressure—a lower pressure produces a lower temperature. The DPC valve opens and closes so that the freezing locker coil pressure is about 20 pounds below the cold plate coil pressure. This simple action produces the two temperatures in the Dual-Temp.

The location of the cooling coils (cold plate and freezing locker) and the DPC valve is shown in the accompanying illustration.

## Principles of Refrigeration

When studying the operation of the Dual-Temp system, we suggest you keep in mind the following simple principles of refrigeration.

1. When a liquid boils, part of it changes to vapor. Thus, boiling is merely rapid evaporation.
2. When any liquid boils (that is, evaporates), a large amount of heat is absorbed.
3. Any liquid can be made to boil at a lower temperature if the pressure on the liquid is reduced. For example, Freon will not boil at 32° if the pressure exceeds 30 pounds. However, if by any means the pressure on the liquid is reduced below 30 pounds, Freon will boil at 32°. In fact, if the pressure is reduced to 5 pounds, Freon will boil at 9° below zero.

4. When vapor under pressure is cooled, it gives up heat and condenses back to its liquid form. For example, steam in an ordinary heating radiator changes to water as it gives up its heat to the air of the room.

5. When vapor is pumped into a closed space, pressure is increased. The best example of this is pumping air into a tire. When vapor is removed from a closed space, the pressure is reduced.

6. The above principles produce a definite relationship between the pressure and temperature. In any properly charged refrigerating system the temperature goes down when the pressure is reduced. Likewise, if the pressure is increased, the temperature goes up. In other words, the temperature depends on the pressure—a lower pressure giving a lower temperature.

## Operation of the System

The following is a detailed description of the action that takes place in the Dual-Temp refrigerating system. Please refer to the drawing on the next page and keep in mind the fundamental principles of refrigeration when reading this explanation.

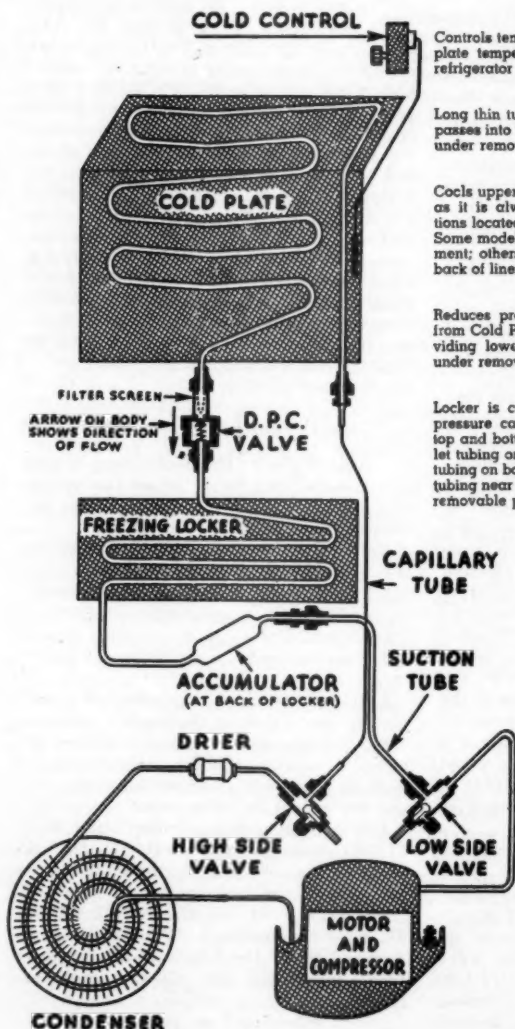
Let us assume that the refrigerator has not been running so that every part of it is at room temperature. The confined Freon refrigerant will be under a pressure of from 60 to 100 pounds. Due to this pressure, the Freon will not boil.

When the compressor starts to run, it pumps some of the vapor out of the freezing locker coils thus reducing the pressure inside of them. As the pressure is reduced, the liquid Freon, which is at room temperature, starts boiling since, as we have explained above, the temperature at which any liquid boils is reduced when pressure is lowered. As soon as any liquid boils, it must absorb

heat. In this case, the Freon changing from liquid to vapor, absorbs heat from the freezing locker. This removal of heat causes the freezing locker to become cold. As soon as the pressure in the freezing locker drops to where it is 20 pounds below the pressure in the cold plate, the DPC valve opens, and now the compressor pumps vapor out of the cold plate, through the DPC valve and through the freezing locker.

Thus the pressure is reduced in the cold plate, the Freon boils and the temperature of the cold plate is reduced.

However, since the freezing locker is at a pressure of 20 pounds less than the cold plate, its temperature will be lower. Reducing the pressure 20 lbs., reduces the temperature about 30°. Thus the temperature of the freezing locker coils will be approximately 30° lower in temperature than the



#### COLD CONTROL

Controls temperature by stopping refrigerator when cold plate temperature gets near freezing point and starts refrigerator when plate warms up to about 40°

#### CAPILLARY TUBE

Long thin tube controls the amount of liquid Freon that passes into "Cold Plate" coils. Upper connection located under removable plate on back of cabinet.

#### COLD PLATE

Coils upper compartment. Ice does not form on surface as it is always above freezing temperature. Connections located under removable plate on back of cabinet. Some models have coils on flat plate inside of compartment; others have coils attached to outside of top and back of liner.

#### D.P.C. VALVE

Reduces pressure about 20 lbs. as refrigerant passes from Cold Plate coils to Freezing Locker coils, thus providing lower temperature in locker. Valve is located under removable plate on back of cabinet.

#### FREEZING LOCKER

Locker is cooled to low temperature, due to lowered pressure caused by D.P.C. Valve. Tubing located on top and bottom of Locker. Aluminum Lockers have outlet tubing on top surface. Porcelain Lockers have outlet tubing on bottom surface. (Shortage of refrigerant causes tubing near outlet to defrost). Connections located under removable plate on back of cabinet.

#### ACCUMULATOR

Retains any surplus liquid refrigerant so that it does not get into suction tube. Located in back of Freezing Locker.

#### MOTOR AND COMPRESSOR (SEALED UNIT)

Pumps Freon gas from cooling coils into condenser. Reduces pressure in cooling coils and raises pressure in condenser.

#### CONDENSER

High pressure Freon gas is cooled here and condenses to form liquid Freon. A fan circulates air thru Condenser fins to remove heat.

#### DRIER

Absorbs any small amount of moisture in system.

#### REFRIGERANT

Freon—12. Charge is between 14 and 15 ounces (Depends on model).



cold plate. These temperatures give air temperatures of about 40° to 45° in the upper compartment; and 10° to 15° in the freezing locker.

The boiling of the Freon has absorbed the heat from the cooling coils. This heat is now in the Freon vapor.

The compressor pumps this heat-laden vapor into the condenser. When any vapor is compressed its temperature rises. Thus as it is compressed into the condenser, its temperature is raised considerably above that of the room air. The fan blows air through the fins of the condenser. This air removes the heat that has been previously absorbed by the Freon. Consequently, the compressed Freon vapor condenses to form a liquid again.

It now is forced through the thin capillary tube into the cold plate. The capillary tube has the proper size hole and the proper length so exactly the right amount of liquid refrigerant passes to the cold plate to replenish the liquid Freon which has been boiled away. The Freon liquid partially boils away in the cold plate; the vapor and the balance of the liquid passes through the DPC valve to replenish the liquid in the freezing locker.

Thus the Freon is used over and over again, merely absorbing heat and changing to a vapor in the cold plate and freezing locker, then being changed back to liquid in the condensing unit, thus giving up heat.

The process described above continues as long as the compressor runs. The pressure does not reduce rapidly since, as the compressor pumps vapor out of the freezing locker, an additional amount of vapor is produced by the boiling. However, the pressure in the freezing locker and the pressure in the cold plate gradually go down as the compressor continues to run. Likewise, the temperatures of both of them go down as the compressor runs and the pressures drop. If the compressor were allowed to run for a long period of time, the temperatures would simply keep going down until everything in both compartments of the cabinet would be frozen.

In the Dual-Temp, we wish to keep the cold plate in the upper compartment above the freezing point so that it will not dry out the air by freezing moisture out of it.

Thus, we use a thermostat, known as a cold control which has its tubing clamped to the cold plate. As soon as the cold plate surface gets close to the freezing point of water, the cold control turns off the unit. The low-

side pressure now rises and the temperature of both compartments gradually goes up. As soon as the cold plate reaches a temperature of about 40 degrees (varies in different models), the cold control again turns the compressor on and the cooling cycle is started again.

## Summary

Whenever the refrigerator is plugged in and turned on and if the cold plate is above about 40 degrees, the compressor will start to run. The pressure in the freezing locker (low-side pressure), the pressure in the cold plate, and the temperatures in those two parts go down. When the cold plate reaches the freezing point of water, the cold control shuts the unit off; then the temperatures and low-side pressure rise slowly until the cut-in point of the cold control is reached, about 40 degrees. The control then turns the unit on again and the procedure is repeated.

As soon as the compressor stops running, all of the liquid Freon which remains in the condenser, is slowly forced up the capillary tube and into the cold plate. Thus the high-side pressure drops down until it reaches 30 to 35 lbs., at which point the pressure does not drop any further.

## Special Features of the System

**Service Valves:** The Dual-Temp system uses a sealed unit but there are two service valves so that you can attach gauges, disconnect the unit, or add refrigerant.

**Replaceable Parts of the System:** The following parts can be easily replaced:

1. Sealed Unit; consisting of motor, compressor, condenser, and drier.
2. D.P.C. Valve.
3. Suction and capillary tubing assembly.
4. Upper compartment cooling coils (cold plate). See section on this subject below.
5. Freezing locker cooling coils are attached to outside of locker and entire locker must be removed. Lockers in Models 660 and 860 cannot be easily removed.

**Upper Compartment Cooling Coils (Cold Plate):** Models 660, 860, 661, 671, 861 and 871 have the coils attached to an aluminum plate inside the food compartment.

Models, 681, 691, 881, 891, 662, 672, 862 and 872 have the cooling coils fastened to the rear and top of the outside of the porcelain food compartment liner. Entire liner is removable.

(Continued on page 44)



# Service Pointers

## Practical Service Men Tell How They Meet New Repair and Service Problems

**U**NDER this department a number of practical service men show a commendable cooperative spirit in passing on to others information on special repair and service problems that may be of much value in these trying times of material scarcity and shortage of competent help. We believe if more readers would send similar contributions, making THE REFRIGERATION SERVICE ENGINEER a medium for the exchange of information on service, much benefit would accrue to all. Similar contributions are solicited from all readers.

### TROUBLE DETAILS OVER PHONE

By Winifred Sallee

**I**N response to B. H. (August issue) who asks for an outline of questions and suggestions to act as a guide in getting information from customers, I have listed the general points of the calls I take. Only the questions dealing with the symptoms of the trouble are asked.

1. Name of firm or person. (Ask the caller to spell.)
2. Name of person calling, if different from above.
3. Address and phone number.
4. Name of refrigerator, and model number.
5. To whom refrigerator belongs if other than above name.
6. Type of application. (Household, meat case, walk-in cooler, soda fountain, ice cream, cabinet, draft beer, bottle box.)
7. If household box, whether hermetic or open type.
8. Age of machine (important if the model number is not given).
9. Nature of trouble. "What kind of trouble are you having?"
  - a. If it has stopped running ask what it did before it stopped.
  - b. If it is noisy ask what kind of noise it is making.
  - c. Does it refrigerate? How much frost is on the freezer?
  - d. What size motor?
  - e. What size and make of belt?
  - f. If refrigerator has stopped for no apparent reason ask the customer to check the wall plug and the fusetron if the motor has one.

10. Date and time of day, noted on memo pad.

If the person calling can give little information ask him to get what is necessary and call back. Also look in office files for additional data on the refrigerator in question.

If the customer's refrigerator has stopped refrigerating, tell him to remove food and leave the door ajar.

If the refrigerator is running too cold have him operate the switch by hand until service man can check.

It is a great advantage to a secretary to have a speaking knowledge of the major parts of the various types of units and some idea of the symptoms resulting from their improper functioning. A study of the serviceman's report on completed work, service manuals, and the discussions of problems in the REFRIGERATION SERVICE ENGINEER are all helps in understanding the problems of the serviceman.

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### CONTRIBUTIONS FROM—

J. L. Ammons

**Replacement for Methyl Formate:** I have found that Methylene chloride makes a very successful replacement for Methyl Formate in rebuilt CA General Electric units. I have charged several of these units with carrene and I found running time and noise level to be equal to the original refrigerant.

**A self starting electric clock** makes a very good timer for measuring running time over a 12 to 24 hr. period. Simply tie the clock behind the switch so that it runs only when the unit is running and figure the time lost by the clock as the time the unit stays off.

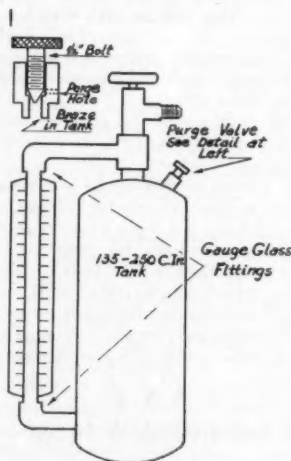
A delco thermal relay is very useful to temporarily replace an electric-magnetic relay while waiting to obtain a replacement. As long as the unit is somewhere near the ampere rating of the thermal relay it will work fine. I have found there is enough lag in the starting relay to bring the motor up to full speed before the starting contacts open, even when the unit is as much as half an ampere higher than the rating of the relay.

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## TIME SAVING CHARGING APPARATUS

By Willard W. Miner

HERE'S a suggestion on how to save a lot of time on many of those small repair jobs. In these days when parts are hard to get and there is always more work than most service men can do, a saving of half an hour on most jobs would be a big help.



I have always had the feeling that when charging a job, I had either too much or too little gas in it. So I built a charging tank fitted with a glass gage and a scale so I can see how much refrigerant I put into the machine. This seems to me more practical than weighing it. I carry large drums of gas in the truck from which I fill the charging tank with the proper amount of gas.

After the job is repaired and ready for the charge, I hook the charging tank on the charging valve. If it is a low side float or

high side float or an expansion valve system, I charge it through the high side of the compressor by turning the tank bottom side up and heating it slightly. If it is a capillary tube system I charge it through the low side letting the pump pump the gas (vapor) in.

This tank also is useful in adding Visoleak or Thawzone to the charge. I also use it to test for an overcharged machine. By having it connected to the high side of the compressor and shutting off the machine and opening the valve on the tank, one can see if any liquid comes back into the tank. Purge tank several times if necessary.

This simple tool also shows the customer that you are adding gas and that you know your business.

## Specifications

To build one of these devices, you will need a tank holding about five to ten pounds of Freon 12 (185 to 270 cu. in.). Also you will need a hand valve, a tee, two steam gage fittings and a glass. Also you will have to make your own purge valve or use another hand valve. Further details in regard to the construction are shown in the accompanying drawing.

When filling the tank add Thawzone or Visoleak first by taking out the purge core and adding the compounds through the purge fitting. Then connect the charging tank to a service tank to get liquid gas from it. Then I open the hand valve and allow the proper amount of gas to enter. Purging may be necessary. Always keep the tank closed and nearly empty when not in use.

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## CLEANING UP STUCK UP JOBS

WHEN cleaning up stuck up or dirty compressors, after disassembling, put all parts in a bucket of boiling hot water with about four tablespoons tri-sodium phosphate per gallon of water. Let soak a few minutes then take a stiff bristle brush and scrub. You will be surprised the way the grease and sludge comes off. Bake dry after washing.—M.A.T.

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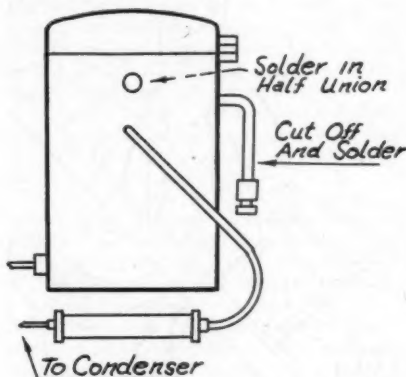
## DRYING OVEN FOR SMALL PARTS

AN OVEN of an old Hotpoint or G.E. range, the kind with the oven up high on one end of the range makes a good rig for small bodies and evaporators. They can be taken off on one piece and the thermostat is built in.—M.A.T.

## REBUILDING CARRENE METERS

By Frank E. Chambers

SINCE new Carrene meters for Grunow refrigerators are no longer available, some of the boys might be interested in knowing how I rebuild them. This applies only to the late type, having a separate capillary tube, fastened to the bottom of the meter with a nut.



As about all that ever happens to these meters is a cap tube plugging up, or the dehydrator becoming plugged up or ineffective due to absorbing all the moisture it will hold, the problem is to get at the plugged dryer. As these are silver soldered, it is a man sized job to get them open without damage, so I just cut off and solder up the inlet tube—the one with a male fitting, solder a half union into the side of the tank and put on an external dehydrator. This short-circuits the defective dryer, and after the capillary tube is blown out from the outlet end, and the strainer cleaned, it is ready for use again.

I drill a 21/32 hole in the side near the top, tap for 1/8 in. pipe, screw the half union in, and solder.

I have had no luck in rebuilding the small ones, and it is better to make a substitute, as was shown in an article on cap tubes appearing in a former issue of the REFRIGERATION SERVICE ENGINEER.

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It takes 27,000 tin cans to provide enough tin for a long-range heavy bomber. But four tin cans are enough for a bomb.

## SPRING IS MADE FROM BOBBY PIN

SUCH a small thing as priorities and a little spring did not hinder C. B. Anderson, a jeweler of Hominy, Okla., from putting his electric ice box in working order. When the refrigerator refused to function Anderson canvassed the town until he found a bobby pin of the right weight. With that he made his own spring. Ice cubes are now being produced by the Anderson refrigerator again.

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## HELP! HELP!

NEW problems for the service engineer which in turn create new questions, answerable only from experience in the field arise every day. Readers are invited to submit questions on which they would like to have information as to what others are doing. Answers are solicited from readers and will be published in the "Service Pointers" department.

## HOW ARE WE LOCATING LEAKS?

Conservation of Freon is most important these days and special effort is necessary to stop those small leaks almost before they occur.

With this thought in mind I am prompted to inquire through your publication just what method is gaining the most favor in the field. Of course we are all familiar with the usual methods of locating leaks but what is being used to give an immediate indication which the customer can detect as readily as the serviceman? Dyes and odorants both have been suggested but which are most successful, or perhaps there is another method.—D. B.

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## APPLICATION OF CAPILLARY TUBES TO COMMERCIAL UNITS

I have been very much interested in the use of capillary tubes in small refrigerating systems and find it is easier at times to convert to the method of metering the refrigerant than it is to secure a new float or expansion valve.

The application so far seems pretty much limited to domestic refrigerators but I am wondering if any one has had experience with capillary tubes on one, two and three horsepower jobs. If so, I would appreciate hearing about how successfully they have performed.

# Keeping Workers from Getting Hurt

The skill and strength of our industrial workers must be guarded against accidents and diseases so as to carry through the war production program. With this end in view, the committee to conserve manpower in war industries has compiled a list of do's and don't's to keep workers from getting hurt. This is the third of a series of articles prepared by the United States Department of Labor so that all workers can check the hazards applying to their own jobs and safeguard life and limb in their own interest and that of war production.

## Hand Tools

1. Use only tools that are properly sharpened and in good condition.
2. Use suitable shields to cover the dangerous parts of sharp-edged or pointed tools that must be carried about.
3. Use only tools free from broken or splintered parts. Be sure that hammer heads are secure on handles.
4. Chisels, hammers, or other tools on which the heads have become mushroomed should not be used.
5. When using wrenches, be sure that the jaws are not sprung and that they are properly applied to the nut, so that the wrench handle will turn in the direction in which the jaws point. Never use a wrench or any other makeshift as a hammer.
6. Use wrenches properly sized for the job; be certain that the wrench is correctly applied to the nut or bolt head. Where necessary to push against a wrench handle in close places, push with the hand open.

## Ladders and Scaffolds

1. Use care in placing a ladder; the foot should be one-fourth of the ladder length away from the wall against which the ladder is leaning.
2. Do not leave tools on top of a step-ladder or on any other elevated place from which they may fall. Effective tool holders should be used.
3. Place ladders only against solid and stationary backing.



4. Always face the ladder when ascending or descending. Use both hands going up or down a ladder.
5. Use only ladders in good repair. Never use a broken or weak ladder or a ladder with missing rungs.
6. No uprights, braces, or supporting members of any scaffold should be removed, loosened, or weakened while any of the scaffold planking or flooring is in place.

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## JOB ACCIDENTS AND WASTE

JOB accidents have killed more of the productive workers of America than have the Nazis and Japanese, maimed millions and caused more waste of production time than almost any other cause. Most of these accidents can be prevented by safety education and the use of safety devices. The major points of safety are important to workers everywhere, and their observance and wide dissemination will aid management, labor, and the government in the prosecution of the war.

# News Briefs on War Regulations

## Chlorinated Hydrocarbon Refrigerants

**C**HLORINATED hydrocarbon refrigerants, commonly used as the cooling gases in refrigerating systems, will be more tightly controlled under the terms of an amendment to Order M-28, issued by the War Production Board August 7, 1943. This amendment will now require consideration by the General Industrial Equipment Division of all applications for allocations on an individual basis. Requirements for refrigerants used in all food processing, storage and dispensing units are excepted under the terms of the amendment.

Classes III and IV of the order have been broken down to subclassifications to provide more detailed information on requests for allocations and to allow the setting up of more efficient controls over applications for and uses of these refrigerants. Requirements for filing of inventory statements of all stocks of these refrigerants on hand, have been broadened to include all users as well as suppliers. These reports must be filed by the 20th of each month showing the inventory position as of the 15th of the month.

The system of classification by use is continued in the amended order. Clauses I, II, III, cover use by the armed forces, Maritime Commission and War Shipping Administration. Class IV includes under Paragraph (a) the use of the refrigerants for maintenance of industrial, wholesale, retail, and household refrigeration systems used for processing, storage, and dispensing of food and food products; but excluding comfort cooling systems and others referred to in Lists A and B of the order.

For the uses mentioned in the preceding paragraph, Freon may be obtained but all such orders must be certified by the user in accordance with form stated in Order M-28 as amended. No supplier may deliver any of the restricted refrigerants except pursuant to an order accompanied by such a certificate.

A further amendment of the order was issued on September 3 to define exactly the additional applications of air conditioning and process refrigeration in which Freon may be used. These are detailed in List C of the amendment:

"List C: Systems and special uses, referred to in Class IV (b), for which a minimum operating charge (or the minimum quantity necessary for a special use, or for a "standby charge") of dichlorodifluoromethane (or "F-12") may be obtained by a user from any supplier, without a specific authorization from the War Production Board, if the supplier has on hand any such refrigerants which were allocated to him for uses covered by Class IV (b), or are carried over from his previous month's supply and are available for such use in accordance with paragraph (d)(4)(iv). A "standby charge" may be delivered only where specifically mentioned below. The systems covered by this list include only those which are operated for air conditioning or refrigeration exclusively for one or more of the following purposes":

Among the List C systems are:

Air conditioning in laboratories conducting tests concerned with the production of parts or instruments for aircraft, combat tanks, ships, radio and radar equipment, and other military combat equipment. Air conditioning for temperature and humidity control: in hospital operating rooms, in the production of turbo-superchargers, for the production of penicillin and blood serum.

Refrigeration: Low temperature metal shrinking cabinets, cooling of rollers or mixers in the production of synthetic rubber. Refrigeration for the production and/or storage of blood plasma (including standby charge).

Freon 12 may not be allocated for use in factory charging of new refrigerating or air conditioning equipment for the Maritime Commission or War Shipping Administration or for charging such systems in the field. Allocations are also denied for maintenance and repair of industrial refrigeration and air conditioning systems not specifically given preference in the order. A special application must be filed with the War Production Board, General Industrial Equipment Division, giving details of the situation and the requirements.

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Notice of intention of engaging in business under the firm name of Compressor Service at 845 East 61st St., Los Angeles, has been filed by W. N. Rose and Fred E. Paugh.



# COMMERCIAL

INCREASE BUSINESS BY  
DOING A MORE EFFEC-  
TIVE JOB OF SELLING

*Selling*

## **"Timesavers" Allow Alabama Refrigeration Service Firm to Get Along With Fewer Men**

*By M. F. Diettrick*

**T**HE use of a novel "timesavers" program which stretches minutes on the job and eliminates cause for lost time is enabling Nolin Brothers Refrigeration Company, Montgomery, Alabama, to meet war conditions more successfully.

"We're running six to eight weeks behind," Mr. B. A. Nolin, one of two brothers who head this commercial dealership, explained, "but we're catching up and getting in position for the summer peak period. We have three servicemen at present besides myself and my brother, where we could use ten. Under the old system, we couldn't handle half the business coming our way, so we've been forced to change our methods to fit the times."

Nolin Brothers were dealers in refrigerated display cases, storage coolers and food refrigeration. With no new merchandise available, the firm has swung into service repair work, and the "re-manufacturing" of display cases into locker plants for farmers and restaurants. Service is the major profit source, of course.

Mr. Nolin "tore the whole system apart" in rearranging facilities to fit demand. "The first thing I did was to set up a first-

come, first-served schedule for every day," he explained, "giving no preference to ordinary work requests. We book every job by the calendar for a specific time, turning down all we can't handle on our schedule. For example, if a locker plant demands that we do their work at a time when we're already scheduled something else, we explain that it cannot be done until whatever time is available to us, and stay firm about it. Usually we can win the customer around to our point."

"One concession we do make, is emergency service in a supermarket or food storage plant. We can't see foods go to waste under war conditions, so we'll juggle the schedule to give response to this kind of call, but we explain to every customer that it must be absolute emergency before we can work on it."

### **Sources of Lost Time**

Mr. Nolin then turned to the mechanical sources of lost time. One of these was the forgetting or misuse of tools. Now, all men carry tools in a company truck, equipped with a tool rack easily inven-



toried at a glance. The tool lineup is gone over every morning, and anything unserviceable or lost quickly replaced. The same type of control is exercised over parts, so that when the truck leaves for any job all the material needed is bound to be there.

### Work Form Saves Time

Biggest timesaver is a work form developed by Mr. Nolin. "Making two trips to any installation is a serious waste. Consequently, we now use a form which is a complete history of the job. Spaces are provided for date of call, time required, name of owner, work done, serial number, remarks about its condition, and a list of parts replaced. One half the form has a space for the work charged, the other for the payment received, and we fill in a profit statement at the bottom.

"This form carries such information that whenever we have a repair job, all facts are there to enable us to load all the proper parts and materials on the first trip. The switch setting, general condition and everything we need to know is on this form, ready for making up the repair parts accurately.

"In addition to this, I'm visiting every user who might call on us for service. I carry a small card on which I jot the facts concerning their equipment. These facts are transposed to the above type form, placed in file, and used when the call comes in."

Another important point is the maintenance of a stock of compressor and refrigeration systems ready to be installed as a whole unit on an exchange basis. Thus, when a creamery compressor breaks down, or a meat case stops refrigerating, it is a matter of minutes to haul in a complete new unit, exchange it, and do the repair work on the old one in the shop during any slack time accumulating. Nolin Brothers have around 25 refrigeration systems on hand, kept on dollies ready to place in service. Half an hour suffices to get the unit in operation in most instances, where as much as a day would be required otherwise.

In commercial repair work, it is often necessary to bring in heavy cases or compressors for shop attention. Formerly, these were hoisted on to a flatbed truck by negro helpers, and lifted down from the truck and pushed into the shop, the whole thing requiring as much as three hours to handle. Mr. Nolin hit upon the idea of purchasing a used grease rack lift from a filling station going out of business, and installing it in front of the shop door. The lift was purchased for \$75 and it took \$25 worth of labor and materials to install it. Lifting ten tons, it is possible to back the truck to it, and push the case on a dolly to a platform bolted on to the two wheel racks. It is then lowered to the dock level, and the case effortlessly shoved into the shop.

On the personnel side, Mr. Nolin has his servicemen telephone in as they complete every job, and ascertain whether there is anything else to be done in that neighborhood. Often a few minutes saved by keeping the serviceman on the job adds up to enough time to get in one more that day. Needless to say, this aids in getting emergency calls answered and saves gas and tires.

### Converting Display Case

These methods have created a smoothly-operating business for Nolin, and even leave shop time for a novel specialty, conversion of old display cases into storage and locker space. The case is turned on its back, reinsulated and the former glass display section is covered with a layer of kapok or other insulation, plywood, and sealing materials. With two or more horizontal doors on the slanting top, these make excellent cold storage receptacles, and dozens of them have been sold to hard-pressed stores.

\* \* \*

But keep going. Wash them, step on them, turn them in—because even an ordinary trainer plane needs the tin from over a thousand tin cans. And to solder the connections of a medium tank it takes the tin from 18,000 cans.

# Low Pressure Chamber Air Conditioned to Improve High Altitude Testing of Army Cadets

*By Donald Delagen*

AIR conditioning is playing still another unusual part in the development of the U. S. Air Force with the addition of refrigerated cooling to the "low pressure chamber" at Maxwell Field, Alabama; a huge steel tank in which aviation cadets learn what the atmosphere is like above 30,000 feet.

Before a package air conditioning unit was added to this basic step in flying training, many cadets "passed out" from the combination of heat and humidity in the chamber, as well as from the lack of oxygen or normal pressure. In testing, the chamber accommodates twenty cadets, stripped to the waist, who enter the heavy tank, and are sealed in. An oxygen mask is furnished each one, with instructions to begin using it as soon as the chamber reaches 12,000 feet.

## Pressure Decreases

With pneumatic machinery drawing out the air, the pressure drops rapidly, to simulate any altitude from ground level to the stratosphere. Army physicians watch the fledgling flyer's reactions through heavy plate glass windows in the tank's sides. When the pressure falls off to less than half standard atmospheric level, and oxygen thins out beyond the amount necessary to support life, any cadet is likely to "black out" the moment he removes his oxygen mask.

Because of the high temperature engendered by the close quarters, tests were not entirely accurate until the air conditioning unit was added. Now, a five-ton package system is used to likewise drop the temperature as the altitude rises—down to approximately 37° F. at 25,000 feet.

Air which enters the tank in tiny streams is passed first through a double bank of fin-type freon coils, where it is

chilled to 30 degrees. The grille, actually a valve, through which it enters the tank, is equipped with a constricted outlet which prevents it from affecting the pressure inside. The conditioning unit is started up some time before the pressure chamber goes into use, and maintains its low temperatures efficiently during the whole time. Cadets thus go through exactly the same atmospheric and temperature conditions as they will encounter "upstairs" and their ability to withstand it is more accurately determined. A group of cadets taking the test is shown in the cover picture of this issue.

Success with this first installation has been so outstanding that air conditioning units will be applied to other low pressure chambers used by Gulf Coast cadet schools and by commercial airlines for pilot testing.

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## Mobile Cooler In Production

A MOBILE cooler and dehumidifier for use by the armed forces in a variety of vital operations is now in production at the plant of Carrier Corporation, Syracuse, N. Y. It was designed so that a minimum of critical materials is used in its construction. Both condenser and evaporator utilize steel tubes and fins and the refrigerant piping is also made of steel.

This equipment was designed to meet a number of needs. For example, when the broiling sun is running up temperatures of 150° to 160° F. inside an airplane that is being repaired or serviced, even the most hardened mechanic can stand the stifling heat for only a few minutes at a time. The new cooler would make workable conditions possible. It could be used also for cooling photographic dark rooms and for radar, radio, telephone and similar operations where extreme alertness is vital.

## Parcel Post Delivery Solves Economy Problems for Refrigeration Parts Firm

*By Bert Merrill*

**O**NE solution to the problems of gasoline and tire economy in parts distribution is the use of parcel post, according to Harold E. Vickers, president of the Refrigeration Supply Co., New Orleans, La.

Mr. Vickers has been using parcel post service for more than a year to distribute tools, smaller parts and even electric motors to refrigeration service organizations in outlying districts and rural towns surrounding the city. When the first restrictions on gas and tires were combined with vastly increased need for refrigeration service, Mr. Vickers resolved to save his rushed customers the necessity of making extra trips for parts, and ran an advertisement in mimeograph form on parts list sent to every customer offering parcel post service. It was headed "When You Are Unable to Visit Us, Phone Your Order. We will deliver any small replacement parts weighing less than fifteen pounds via parcel post. There will be no extra charge for this service, and we will both save gas and rubber."

Outlying service organizations, particularly smaller ones, were quick to take advantage of the idea, and began ordering by telephone and mail. Actually, it has increased sales, according to Mr. Vickers; not only cutting down on trips and lost time for customers, but encouraging them to order quickly other parts which may have been forgotten on regular visits. Almost every firm on the list has been ordering more under this system.

"We can send a ten pound part into almost any area we serve for around twenty cents," Mr. Vickers pointed out, "and often can keep up the customer's inventory without the necessity of a personal visit either way. Of course twenty cents is no cost at all compared to the cost of truck transportation from our building

into outlying districts, and most refrigeration service organizations are willing to pay that small cost rather than take a man off his route to come for parts. We can save our single truck for important commercial refrigeration in defense plants, buildings, etc."

The jobber has set up a program for saving and buying extra cardboard boxes of all sizes and variety in which parts can be shipped out to customers safely. Expansion valves, coils, electrical parts, trays, belts, soldering equipment, tools, etc., are all sent in cardboard, but larger items such as motors, compressor parts and other merchandise are given a wooden crate made in the shop and stenciled with the customer's name. It has of course been necessary to set up a sort of miniature shipping room for sending out the packages, but a girl in the office does most of the packaging work. Anything heavy can be handled by the delivery driver if necessary. Packaging cost has been kept to an absolute minimum by buying up old boxes from junk dealers, business-building janitors, etc.

Mr. Vickers has found that cutting out the expense and time factor in obtaining parts appeals to all customers, and offering the service to those in districts which had not been reached even before the war brings in many additional orders.

When parts are not immediately available in stock, he telephones the customer, and asks whether he wishes to be placed on list for it as soon as available. Most of them do—and consequently there is always a large "waiting list" which is handy reference in buying. Used parts are sent out in the same way, and where a worn part must be returned in exchange, Mr. Vickers recommends that the customer use parcel post for sending it back.

# The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

## COMMENT ON QUESTION 557

Referring to Question 557 in the August issue, I see someone is having trouble with a Grunow motor which will not run unless the starting relay is lifted up. If the rotor is soldered with a good grade of solder, it will work like a new motor. I have serviced such motors that looked O.K. but still would not develop the correct speed. For this unit to function efficiently, the rotor should be balanced and cleaned before soldering as that is the cause of the rotor not getting up its speed.—E. KNEEBONE.

## MAKING A FREEZER CABINET

QUESTION 558: We have an old Kelvinator scaltite cabinet. The inside dimensions are 15" deep, 22" wide and 33" high. We wish to convert this cabinet to a freezer cabinet. Can you advise us how many feet of either  $\frac{1}{2}$  inch or  $\frac{3}{8}$  copper tubing would be required to properly cool this cabinet to 0-10 above? We have a quantity of scrap tubing in both sizes—more of the  $\frac{3}{8}$  than the  $\frac{1}{2}$ . We would use a  $\frac{1}{2}$  hp. Servel hermetic unit.

Around this cabinet would be built a frame work that would allow us to add about three or four inches of rockwool insulation. This then, would be kept in a basement pre-cooler with a temperature of 40 degrees. We have another cabinet we could build, but this would be in a basement at a maximum temperature of 70 degrees. What type and size of thermostatic expansion valve would you recommend? Both cabinets would lay on the back so that the door opening would be on top, to prevent cold air spilling out. These Kelvinator cabinets originally contained two inches cork board. Any information that you can give us as to the lineal feet of tubing will be greatly appreciated. The cabinet would be used for storing products already frozen. The second cabinet would be used to freeze and store products. Are there any Dole plates available for this work?

ANSWER: For the Kelvinator cabinet which is being installed inside a storage cooler, I believe that about 20 ft. of  $\frac{1}{2}$  in. tubing bent on 3 in. centers and soldered to

plates fitting the sides of the cabinet would be about right for the conditions you have stated.

This cabinet would require comparatively little refrigeration providing the products are to be frozen before placing in the cabinet. The other cabinet which is to be used for freezing, and which will be subject to a higher ambient temperature will require a lot more refrigeration. The exact amount, however, can only be determined by knowing in advance the quantity and kinds of food to be frozen and the desired speed of freezing.

I would suggest that your coil be constructed in the same way as described for the other cabinet, and that the plates be arranged in shelves on which the food to be frozen can be placed. In this way, the freezing will be done by conduction rather than convection.

Without knowing definitely the amount of tubing that would be required in this cabinet, I would hazard a guess that 30 ft. of  $\frac{1}{2}$  in. tubing would be sufficient. It is my understanding that Dole plates can be purchased only on priority, but it would do no harm to write them and make inquiry.

## STEWART WARNER D.P.C. VALVE RESTRICTED

QUESTION 559: I have a Stewart Warner C-769-2087 for service. About a year ago, a service man added Freon to the system. This winter I was called. I changed the seal and charged the system with enough refrigerant to balance the system—then the unit seemed to operate very well for about a month, but now, it freezes down, in the lower compartment, but has no reaction in the upper coil. The upper coil was 65° approximately, when the lower coil was 25°. I have no information for servicing this unit, but believe it is overcharged (F.12). I do not have time to putter with it and dislike such a procedure. Does the above give you enough information to assist me?

ANSWER: The symptoms in this instance indicate a restriction at the D.P.C. valve. This restriction may be caused by moisture

in the system freezing at that point, or the screen in the drier may have broken loose allowing some of the drier material to circulate as far as the D.P.C. valve and cause a blockade at this point.

The remedy in either case is to replace the tubing assembly and the D.P.C. valve. The tubing assembly contains the drier and thus replacement of this part is desirable in either case.

To remedy this situation, it might be well to separate these lines for a distance of several feet from the coils, so that an individual suction line is run some distance away—thus, allowing the return gases to be dried out before the junction is made at the tee.

Another method is to put a loop in the return line between the coil and the tee which would act as a dryer coil.

With reference to the multiple systems, this sounds to me as though there is too much oil in the individual boilers, and not enough refrigerant in the system. A heavy blanket of oil in each boiler would cause the low suction pressure, while at the same time, the temperature obtained is normal. Insufficient refrigerant would cause the unit to run a greater length of time because the boilers on the top floor may not be getting enough refrigerant to cause them to close off tightly, and there may be hot gases bypassing through these boilers to the low side.

It is sometimes difficult to determine when these systems have sufficient gas, and for this reason, I believe it is a good idea to install a sight glass in the liquid line near the condenser.

## GENERAL ELECTRIC CA UNIT

**QUESTION 560:** Last week, I was called on to service a General Electric, Monitor type, CA-1 refrigerator charged with 2¼ lbs. of Methyl Formate. The customer said the machine would not start after it stopped, and that smoke came from the relay. So I took the relay apart, finding the points burned very badly. I dressed them up, and told the customer they should get a new one before the hot weather comes, so they advised me to order one, as the G. E. agent in town is not working on refrigerators, but is working in a defense plant, and did not have the part I sent right to the factory. They referred me to a company in Pittsburgh, and they told me I had to send in the old part. In the meantime, the relay

was working good, so I took it off and sent it to them. They sent it back and referred me to the dealer in town and said I would have to get it from him. It took two weeks, and I did not receive the part, so I got the old relay back, to give the customer refrigeration until the new relay comes.

Installing the relay and checking the wiring, I started the machine, but I found out I had to do what I did before. Then the machine ran, but did not cool down enough to shut off after running three hours. The dome got very hot—the condenser and the float. I bumped the float several times as there was refrigerant going through the coils, but a hissing noise was present. This did not do any good. I then put hot water in trays and heated up the evaporator. This caused the machine to get hotter, and when I stopped it, it would not start until it cooled off a little.

I would like you to tell me what is wrong and how I can remedy the trouble—also where I can get the gas.

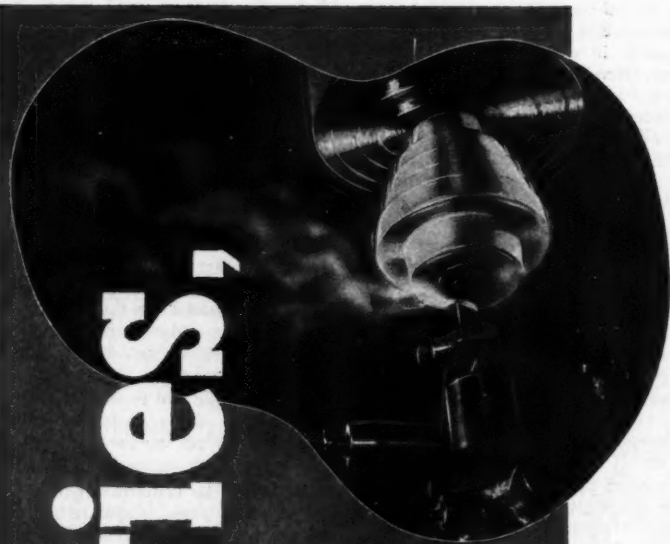
**ANSWER:** In the first place, no attempt should ever be made to repair a G.E. relay in the field. These relays are built to operate on an amperage difference of two tenths of an ampere. Any filing or adjustment of contacts, changes the balance of the relay armature, often resulting in the contacts holding closed too long, and eventually burning out the motor windings. Always replace a troublesome relay.

From the description of the running trouble, it sounds as though the float might be stuck open. However, an overcharge of gas would give the same result. You did not state and probably do not know if gas has ever been added. The only way I know of to check an over-charge is to check the suction tube where it leaves the evaporator. Under normal operation and with a good coating of frost on the evaporator, the suction tube should show no frost. If it does show frost, the machine is undoubtedly overcharged. To purge the excess gas, open the purging valve on top of the float one-half, turn and leave open two minutes and then close. Allow the machine to continue running five minutes and if frost still appears on the suction tube, purge again and continue these periodic purgings until the liquid in the evaporator is at the proper level.

If the suction tube is not frosted and the hissing noise still prevails, and light bumping of the float valve does not stop it, the only alternative is to send the unit to the



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frigeration's new Wartime duties is one of A-P's most gratifying tasks. Today the A-P Research Staff is looking farther ahead, into post-war markets, working with manufacturers readying revolutionary new products that will carry tomorrow's progress in Refrigeration to new achievements. Perhaps we can help with YOUR plans!

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factory for rebuilding. Replacement units are no longer available. During all this procedure, observe the "Don'ts" published on page fourteen of the March 1943 issue of THE REFRIGERATION SERVICE ENGINEER.

Methyl Formate can be purchased only from G. E. dealers or distributors. Do not attempt to use any other refrigerant, as very bad results are sure to follow.

### GIBSON UNIT

QUESTION 561: I have specialized in Gibson Service for the past three years and have had to take over when the other fellows got stuck, but I have an apartment house Model No. 699 that has me very confused. The first indication was that it was short of refrigerant, so I charged it after testing the pump for suction pressure. Although it drew only 15 inches of vacuum, it started refrigerating after I had obtained the proper pressures. I tested for leaks, but found no sign of any. It worked all right for about a week, but then the party called and said it had quit quite suddenly. I spent about three hours trying to get it to working again, but the pump didn't seem to be able to pull more than ten to eleven inches, so I had it brought to the shop. I removed the compressor and found that one head valve had broken off and had been ground to small bits. The float was partially plugged, too, so I repaired all the damage and installed a new float.

I charged the unit to a frost back and purged to correct my frost line to the right place. This is a 6.9 cubic foot box of the apartment house type and should maintain an average box temperature of 45° to 50°. My "on" and "off" cycles were perfect, but the last boiler would defrost on the "off" cycle. Thinking I might have a bit of air in the system, I purged out and then charged to a frost back and corrected my frost line again. Same effect as before, last boiler defrosting on "off" cycle.

I next charged to a frost back of about two feet outside of the box and let it run that way for a while to carry off any excess oil that might be lodged in the evaporator. After the charge had settled down, I purged to correct my frost line and also get out any air that might be settled in the highside float.

I repeated this procedure several times to make sure things were as they should be, but to no avail. My running and off cycles leave nothing to be desired, and the water that collects in the bottom of the box from the defrosting boiler will freeze on a normal

setting. This is something that I have never seen before, so now I'm asking for your assistance to help me solve the baffling mystery.

ANSWER: It is evident that the proper diagnosis was made originally when the heads were repaired.

It is easy to appreciate that the difficulty experienced following this adjustment would be quite puzzling. You will appreciate that it is impossible for us to make an exact diagnosis without having the refrigerator itself to check—particularly inasmuch as the condition outlined is very unusual.

However, it is possible that the last boiler would defrost due to leaking head valves. Leaking head valves would cause an increase in pressure at the evaporator at the beginning of the "off" cycle and thus possibly cause this defrost condition outlined. Of course, the leak at the head valve itself could be the result of a particle of foreign matter between the valve and its seat.

### COPELAND CONTAINING ALCOHOL STUCK UP

QUESTION 562: I have just received a Copeland domestic in my shop with a CH-3-CL charge. I've been informed that into this system, a goodly amount of wood alcohol was dumped to take care of moisture, and then was left all winter.

Everything is set up tight and, to date, I have not been able to loosen the shaft or piston even with connecting rod disconnected. The oil in the pump was like a mixture of heavy transmission grease and sawdust, with a very disagreeable odor like rotten cabbage. I've tried everything at hand to dissolve this mess including carbon tet.

Since this job was run a short time before being left idle, the whole system must be in the same condition. Is there any way this system can be cleaned of this condition, or will it have to be junked?

ANSWER: You have a difficult job on your hands to free the piston from the stuck up Copeland unit. This gummy substance can be easily removed from any of the surfaces which are out in the open where solvent can readily get to them, but it is difficult to get a solvent to penetrate between the cylinder wall and the position.

The only thing I can suggest is that you boil all the parts of the compressor in a strong solution of Tri-Sodium phosphate. Those parts exposed to the solution will not

have to be boiled only a short time, in order to remove the gum. The piston and cylinder may require an extended length of time before the solvent will penetrate between them.

The heat of boiling should help during this process, since the cylinder walls will be expanded and it may be that while the boiling is in process, you can push the piston out, or move it sufficiently to help penetration between them.

### KELVINATOR STUCK UP AFTER CHANGE TO ISO-BUTANE

QUESTION 563: I have a problem which I would like to have you hear about. I was recently called to service a Kelvinator refrigerator which wouldn't run, and as soon as I started to check the machine, I found that the compressor was frozen and would not turn. It produced no results even by trying to use a pipe wrench on the fly wheel. I tore the compressor down and found it had set up because of moisture. This refrigerator was serviced some six months ago, and it had a small sulphur leak. The repair man discharged the unit and recharged it with Iso-Butane. The refrigerator has no model number as it has been painted over, and as near as I can determine, it is a 1933 model, D-75-L Kelvinator. Now what I am wondering is, wouldn't it produce serious results by putting Iso-Butane in this unit without first baking and drying the complete unit, including the Brine tank? Would you suggest that the cooling unit and also the condensing unit be sent in to the factory for baking and drying? If this is to be done, wouldn't you recommend that the unit be recharged with the proper refrigerant and oil? If you have any other suggestions, will you kindly submit them? Will you please answer as soon as possible as I am anxious for your suggestions?

ANSWER: I can't understand why anyone would substitute Iso Butane for Sulphur Dioxide when  $\text{SO}_2$  is much more easily obtained, and is a better all-around refrigerant for household use. The stuck-up condition which you find in this unit is, no doubt, the natural result of this change because it is unlikely that all traces of sulphur were removed before charging in the new refrigerant, and the combination of Iso-Butane  $\text{SO}_2$ , moisture and other products would most likely create the gummy deposits.

I think it would be advisable to plan on changing the unit back to  $\text{SO}_2$ , and it will

certainly be necessary to make a thorough cleaning job of all parts of the system, and have them thoroughly dehydrated in a bake oven after the cleaning. If you do not have any baking equipment with which to do this job, your best plan is to return the unit to the factory.

### "BUMP" IN EVAPORATOR

QUESTION 564: I have been a member of R.S.E.S. for four years and an interested member of Maple Leaf Chapter at Toronto, but being nearly 100 miles away, I am not able to be present very often. However, I have received many times the cost of membership from the REFRIGERATION SERVICE ENGINEER magazine alone—also the satisfaction of interesting others in the Society.

My reason for writing at this time is to ask information regarding a Majestic Model No. 51 with R.I. motor. This unit would not operate at all. We went over the compressor completely, not being able to secure any parts, and lapped in the needle and seat of the evaporator. The unit was then charged with the proper quantity of oil and  $\text{SO}_2$ , and for some time, it worked very well.

Now when the unit cuts in, there is a decided bump, which takes place in the evaporator—sometimes the bump sounds louder than other times. While this bumping goes on, the machine works O.K. as to cycles, but on a very warm day, the compressor will start slopping—then it will stop freezing. When shutting the machine down for about two hours, and starting up again, it will work for two to three weeks or longer, and then act up again.

Any information you will give us on this machine will be greatly appreciated.

ANSWER: The bump you hear in the evaporator of the Majestic refrigerator is probably due to a blanket of oil on top of the refrigerant in the evaporator. This blanket of oil acts as a resistance through which the vapor refrigerant must be drawn, before it can reach the return line.

When the machine first starts, a pressure difference will be created between the top of this blanket and the refrigerant which lies below it. When the pressure difference has reached sufficient force to draw the vapor through the blanket, it will break through in a rather large accumulated bubble, which will splash the oil against the top chamber of the evaporator, causing the bumping noise.

(Continued on page 44)

# Chicago Concern Launches School For Training Service Men

WITH only 5,600 registered refrigeration service firms (WPB figures) left in the country to take care of necessary domestic and commercial installations, it's high-time that attention was focused on the recruiting and training of manpower for the refrigeration industry.

Why and how the ranks of competent servicemen were so badly depleted is a story in itself. All that need be said is that Government officials seem to have overlooked the fact that the man behind the man behind the gun had an appetite for unspoiled food. And that oversight allowed draft boards to induct practically one-third of the nation's refrigeration men. Then came the awakening! Major Hershey of Selective Service finally suggested to his various state board directors that refrigeration men be given deferment until October 1. Apparently after a second look at the facts and figures, he hastily included "gas or electric refrigeration repairmen" on his newest list of "critical occupations," with deferment for the duration in the offing.

Starting from there, then, the industry is now faced with a double-barreled manpower shortage problem of no mean proportions. First, men must be quickly recruited into re-

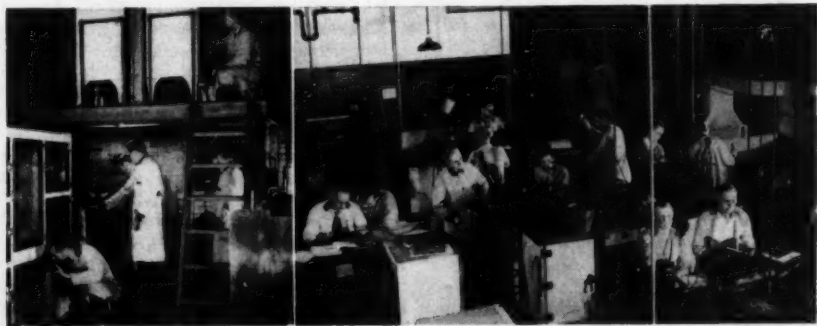
frigeration service work to keep all present equipment in running order. Second, the industry and its men must be prepared to take on the servicing problems which the post-war era will present.

## Training Is Necessary

Boiled down, it is largely a matter of training. Competent refrigeration servicemen are not auto mechanics, handy men or jacks of all trades. They are men who, first of all, must know refrigeration, and, secondly, have the mechanical skill to nurse balky controls, compressors, tube lines, and whatnot. The average "Handy Andy" is lost unless he has a sound knowledge of refrigeration to back up his tool work. Instilling that vital background knowledge in mechanically-minded men is the job of the mechanical refrigeration trade school.

One such school which has done an outstanding job in the industry for the past 17 years is Utilities Engineering Institute, 1314 West Belden, Chicago 14, Illinois. Over the years, this school has graduated thousands of men trained in both the theory and practice of modern mechanical refrigeration.

In the light of the present and predicted shortage of servicemen, the activities of this



Two views taken in Utility Engineering Institute shop laboratory. Left: Commercial and domestic installations being worked on by students. Right: General view of students at work at workbench.

The pipe sockets of **STREAMLINE** Wrought Copper Fittings are machined, thus maintaining very close capillary tolerance. They are of ample length and well within the strength limits for soldered areas as determined by the National Bureau of Standards. They provide adequate support for the pipe lines.

The shoulders or pipe stops are positive and at right angles to the fitting. This feature acts as a stop in preventing the liquefied solder from getting into the pipe lines.

**STREAMLINE** Wrought Copper Tees and Elbows are protected with heavy paper board caps which eliminates all dirt or foreign particles from entering in stocking, handling, or shipping. The caps also afford protection against the solder cup becoming distorted and out-of-round.

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training organization are of unusual interest and significance. For instance, the Deep-freeze Division of Motor Products Corporation has recently entered into a contract with the Chicago school to recruit and train upwards of 1500 men for post-war service work on Deepfreeze units and equipment. Utilities is already well into the program.

### Spare-Time Course

Other Utilities Engineering activities include the recent establishment of a spare-time resident school in which interested men can train several nights per week without interfering with their present regular employment. So popular is this type of training, the school has just announced that it will now be available five nights a week, thus accommodating many more men. Convenient schedules can be arranged to accommodate the available spare time. A feature of this training is the fact that a man can commence at any time. Instruction is highly personalized and there are no classes in the usual sense of the word. Out-of-Chicago men are served by the school through its "Balanced Training" program, which combines preparational study with actual shop experience and practice.

Keenly aware of the critical service man shortage, Utilities recently conducted a survey among leading firms in the industry to find out the consensus of opinion regarding post-war refrigeration expansion. In answer to the school's inquiry, executives of large concerns expressed such opinions as "possibilities are for a much greater increase in refrigeration use whether it be for air or liquid, and there will be need for many more men for its maintenance."

Perry Joy, vice-president of Super-Cold Midwest Company, believed that "the post-war demand for refrigeration, and refrigeration maintenance men, will be tremendous. We believe that the demand for refrigeration after the war will be practically double.

E. W. Lang of General Electric Company, summed up his thoughts this way: "I am of the opinion that our post-war work on refrigeration will be greater than anything we have experienced so far, and for this reason will require more men to take care of the servicing in the field."

Spurred on by such comments, this trade school is bending its efforts to the selection and training of men for the industry, thus hoping to help avoid a future breakdown in the nation's refrigeration service.

## MODERN NAVY RATIONS SHOW BIG IMPROVEMENT

THERE is no better way to underscore the importance of refrigeration on United States fighting ships than to compare Navy rations 100 years ago with those of today, R. L. Tomlinson, manager of the Marine Division of Carrier Corporation, stated recently.

In 1842, the Navy ration was "improved" over the one that had formerly been served, Mr. Tomlinson said, quoting the following from a service document:

One pound of salted pork with half a pint of dried peas or beans; or one pound of salted beef, with a half pound of flour, and a quarter of a pound of raisins, dried apples, or other dried fruits; or one pound of salt beef with a pound of rice, two ounces of butter, and two ounces of cheese; together with fourteen ounces of biscuit; one quarter of an ounce of tea, or ounce of coffee, or one ounce of cocoa; two ounces of sugar; and one gill of spirits; and a weekly allowance of half a pound of pickles or cranberries, half a pint of molasses, and half a pint of vinegar.

Fresh meat may be substituted for salted beef or pork, and vegetables or sauerkraut for the other articles usually issued with the salted meats, allowing one and a quarter pounds of fresh meat for one pound of salted beef or pork and regulating the quantity of vegetables or sauerkraut so as to equal the value of those articles for which they may be substituted.

This can be compared with the following typical menu served today aboard a battleship on a week day:

**BREAKFAST:** Chilled fresh oranges, assorted dry cereals, milk baked pork sausage, creamed diced potatoes, apple cake, bread, butter and coffee.

**DINNER:** Cream of split-pea soup, pot roast of beef with brown gravy, oven-baked potatoes, steamed string beans, marble cake, bread, butter, coffee or tea.

**SUPPER:** Boiled spaghetti with fresh meat balls, Spanish sauce, steamed succotash, hot spiced beets, fresh hermits, bread, jam and cocoa.

Actually more than one-half of the 10,000 to 12,000 pounds of food consumed daily aboard a modern battleship is taken from cold storage, Mr. Tomlinson pointed out.

Freezer storage aboard ship is used primarily to hold meats, fish, poultry and but-

(Continued on page 44)

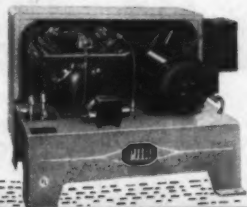




*New Horizons* Look for a moment at the market of tomorrow. You'll see an America with a broad background of war production experience . . . people in every walk of life mechanically minded . . . prospects who appreciate, as never before, the value of fine equipment. When the day of peace comes we will be equipped . . . through the valuable lessons learned at war assignments, and the broad background of our past experience . . . to produce PAR Condensing Units which will continue to be outstanding in their fields.

Manufacturers of  
PAR Commercial Refrigeration Equipment

**PAR**  
DIVISION



LYNCH MANUFACTURING CORPORATION - DAYANCE, OHIO, U. S. A.

## Locker Plants and Home Freezers Help Conserve Food Crops

ONE way to enjoy this summer's Victory Garden all year around is to wrap it in cellophane and freeze it while it's fresh. Approximately a million American families are doing just that, either at home or in community establishments.

Heavy military demand on the limited supply of canned goods, and the general need for conserving every pound of food, have given the food-freezing processors the biggest job in their history.

Frozen food locker plants, capacious community pantries kept at zero degrees or below, are largely a product of the past decade. But they have grown fast—trebling in number during the last five years. Recent Government surveys reveal 4,600 locker plants located in 46 states, handling about a half-billion pounds of meat, poultry, fruit and vegetables a year. Most of the plants are concentrated in the Middle West and Pacific Northwest, with Iowa, at 550, and



Wrapping Victory Garden produce in cellophane and freezing it at locker plants will provide fresh, flavorful food to approximately a million American families this year. There are 4,600 locker plants, mainly in rural and suburban areas.

LEFT: Here the housewife wraps moistureproof cellophane around ears of sweet corn, after proper blanching in steam or boiling water. Household rolls are available for this purpose, but one should make sure of getting the moistureproof variety of film.

RIGHT: An ordinary curling iron heat-seals the moistureproof cellophane bag, thus preventing escape of moisture and flavor during freezing and storage.

## THE STANDARD OF *Enduring Craftsmanship*

*Medieval Armourer at Work*



Since time immemorial armor-making has been a practical craft. Defensive armor which protected battle leaders of ancient times had essentially the same objective as the armor-plate of today's battleships, tanks and planes. In the evolution of the venerable craft of armorer to the great war industry of today, one guiding factor has remained constant, i. e., consideration of the ultimate use of the product.

*The suitability of a product to its uses and the convenience with which it can be applied is the prime guidance for the methods by which Virginia produces and distributes its products.*



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AGENTS FOR KINETIC'S "FREON-12"

**VIRGINIA SMELTING CO.**  
WEST NORFOLK, VIRGINIA



Washington, at \$75, topping the list. Of the million families served about three-quarters are farmers.

In addition, there are nearly 60,000 home freezer units in use. Machinery shortages have retarded further manufacture of them. Ice cream cabinets have been removed from behind soda fountains in many places and carted off to a farm to freeze beans and chickens for next winter's table.

As in the case of dehydrated foods, frozen foods do not keep well if they are not properly packaged. It is just as important to prevent frozen food from drying out as it is to prevent dehydrated food from absorbing moisture. The air in most low-temperature freezing and storage cabinets usually has a low relative humidity, due to the fact that the moisture condenses as ice on the refrigerated surfaces. Therefore, a moisture-vaporproof material, such as cellophane, is necessary to keep the moisture in the food itself from evaporating.

The moistureproof type of cellophane, developed by a Du Pont chemist, has always been a preferred material for wrapping commercially frozen foods. A leading authority in this branch of the food field describes moistureproof cellophane as "the best commercial material available today for the preservation of quick-frozen foods." It not only retains freshness and natural flavor, but also protects the food from foreign tastes or odors. However, the type of film known to the trade as "plain transparent" cellophane should not be used in this application as it is not moistureproof.

### Special Locker Containers

A number of container manufacturers recently have developed special containers for foods to be frozen in the locker plant or home freezer. They incorporate moistureproof cellophane as a liner in a bag to be heat-sealed after filling. The outer package is usually of moisture-resisting cardboard and in some cases has a window so that the contents may be readily identified.

There are several different types of containers, one of the most popular being the moistureproof cellophane bag used alone or put in a box or paper bag for rigidity. Another type is the bag already attached to the inside walls of the box. Still another type is the box with an attached liner of moistureproof transparent cellophane.

Not only vegetables and fruit, but cut-up poultry can be packed in these containers,

heat-sealed and then frozen. Dressed poultry and large cuts of meat are wrapped in sheets of cellophane, usually cut from a roll. Sealing can be done in the home with a curling iron or a flatiron.

The packaging materials for frozen food may usually be obtained at locker plants or from paper supply houses or dealers in freezing equipment.

The commercial quick-freezing industry, distributing its products to the consumer through retail stores having low temperature cases, has also reached new highs in production and is handling a record volume of food this season for both needs of the Army, as well as civilian use. Here, too, cellophane is used extensively.

Food freezing in all its branches has proved so satisfactory and has provided such an easy method of preserving foods that it promises to become increasingly popular. For the duration of the war, it will be limited only by the amount of equipment available.

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### MECHANICAL REFRIGERATION SAFETY CODE

THE City of Long Beach, Calif., has issued, in handy booklet form, the Mechanical Refrigeration Safety Code. This city ordinance has been in force for some time and has proven very effective in regulating the installation and repair of refrigeration equipment in Long Beach to the benefit of the owner and in promoting the safety of the public.

The foreword explains that the Code has been printed in booklet form for the convenience of refrigeration mechanics, contractors and for the building public to acquaint them with the various provisions which govern the examination of refrigeration mechanics, the registration of refrigeration contractors, the conduct of the refrigeration examining board and the establishment of permit fee to be paid. The provisions of the Code also govern the installation of mechanical refrigeration systems, including those used in air conditioning.

A topical index in front makes information on specific subjects instantly available and enhances its value as a reference book.

If any readers wish a copy of the Code, one will be sent upon request to Mr. A. M. Schinnerer, refrigeration inspector, Long Beach, Calif.

**"The Chart is a necessary part of my equipment"**  
so says this  
service man

• Now that the Calculator is being put to the test of practical use in the field, we have had a number of letters from service men testifying to its value. This one is typical.

**WRIGHT'S  
H. B. P.  
CALCULATOR**

Sometime ago I purchased a Head-Back Pressure Calculator from you, but misplaced it. The chart is a necessary part of my equipment, so please send me another.

*J. V. Farmer*

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Isobutane	Freon or F-12
Sulphur Dioxide	Ammonia
Carbon Dioxide	



Actual Size  $3\frac{1}{4}'' \times 3\frac{1}{2}''$ .

**A Vestpocket Tool  
Every Service Man  
Should Carry**

A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

**POSTPAID \$1.00**

**NICKERSON & COLLINS CO.**  
435 N. WALLER AVE., CHICAGO

## THE DUAL-TEMP SYSTEM

(Continued from page 20)

*Arrangement of Freezing Locker Coils:* All Freezing Lockers have coils permanently attached to top and bottom surfaces of the outside of the locker. Freezing Lockers are either porcelain or aluminum. The major difference between a porcelain and an aluminum locker is the arrangement of the coils.

Coils on *Aluminum Lockers* are arranged so that liquid refrigerant *Enters at the Bottom*; the outlet of the coils on the upper surface connects to the suction line.

Coils on *Porcelain Lockers* are arranged so that liquid refrigerant *Enters at the Top*; the outlet of coils on the bottom surface connects to the suction line.

This difference of tubing arrangement is of considerable importance when trying to determine whether there is a shortage of refrigerant in the system. The tubing nearest the suction line connection will defrost if an appreciable shortage of refrigerant occurs.

\*\*\*

## MODERN NAVY RATIONS

(Continued from page 38)

ter. The chill rooms hold such items as fresh vegetables and fruits, eggs and cheese. Although dehydrated and canned products are being used more extensively than before the war in order to conserve space, even now a large proportion of the ship's food must be held under refrigeration. As a matter of fact, some of the dehydrated foods, particularly powdered eggs, require refrigeration if they are to be held for any length of time.

\*\*\*

## THE QUESTION BOX

(Continued from page 35)

An overcharge of oil in the system will sometimes cause this situation, but since you are able to obtain satisfactory operation for periods of two to three weeks, I am inclined to believe that your trouble is a shortage of refrigerant.

If there is not sufficient refrigerant in the system to fill the evaporator to its proper level, there is a tendency for the oil to leave the compressor and accumulate in the evaporator. Adding refrigerant to the system will force this oil to return. I think by adding refrigerant to this system, you will overcome the trouble.

## EXPLOSION IN AIR CONDITIONING SYSTEM CAUSES DEATH

**NOTE:** We are presenting the following preliminary news report in absence of any official or technical explanation as to the actual cause of the explosion. While the lack of technical information available at present makes it difficult to understand, it is hoped that later information will furnish some idea as to its cause.—The Editors.

**A**N explosion in the Peabody Theater, Memphis, Tenn., Thursday evening, August 19, caused fatal injuries to Elroy R. Curry, maintenance man in the theater. Curry later died as a result of his injuries. Attorney General Gerber began an investigation into the explosion the following day. The cause had not yet been determined.

The explosion occurred less than 12 hours after the manager allegedly used a substitute refrigerant (methyl chloride) in the theater's air cooling system, a substitute for which the system allegedly was not designed. The cooling system, it was reported, was designed for Freon which has been "frozen" by the WPB since July. It was reported that the refrigerant became ignited as it leaked from the unit.

Newspaper reports indicate that the theater manager had been warned against making the change in refrigerants and it has been suggested that the explosion resulted when the maintenance man attempted to locate the leak.

In order to prevent similar disasters, city officials arranged for a licensed engineer to check all air conditioning systems in the city to see that they comply with the City Code. Local engineers have advised that methyl chloride can be used safely as a refrigerant if proper precautions are taken. Some systems designed for Freon cannot be used for methyl chloride while in the case of others the change-over can be made safely, providing the proper precautions are taken.

Full discussion on proper methods to use in changing over from Freon to methyl chloride were issued in bulletin form and distributed to members of the Refrigeration Service Engineers Society and published in the August issue of *THE REFRIGERATION SERVICE ENGINEER*. This article points out that the thermodynamic properties of the two refrigerants, methyl chloride and Freon 12, are quite different, therefore when substituting methyl chloride for Freon 12, it is essential that a number of points be given special consideration.



HERE'S HOW *Temprite*  
*Oilrite* AUTOMATIC OIL SEPARATOR  
**Improves OPERATION  
 OF LOW TEMPERATURE  
 REFRIGERATION EQUIPMENT**



**SIZES**  
 Capacity from 1/6 H.P. to  
 50 tons. Operates with  
 either Sulphur Dioxide,  
 Methyl Chloride or  
 Freon 12.

- ① By permitting the refrigerant to evaporate at its true boiling point because it is undiluted by oil.
- ② By preventing the formation of oil film on the heat transfer surfaces of cooling unit and condenser, lower temperatures, faster heat transfer, and greater capacities are obtained.
- ③ By keeping the oil in the compressor where it belongs, the separator assures proper and continuous lubrication of working parts. Seal leaks, scored cylinders and burned out bearings are eliminated.

**IMPORTANT:** While oil separators are highly desirable on normal temperature units, they are a "must" for the efficient operation of low temperature equipment.

★ **APPLICATIONS** ★

Low Temperature Food Storage • Quick Freezing Applications  
 Low Temperature Industrial Coolers • Rivet Coolers • Steel  
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*Dealers*

Write our sales department today for special booklet and specification bulletin covering the complete line of "Oilrite" oil separators.

**TEMPRITE PRODUCTS CORP.**

*Originators of Instantaneous*



*Liquid Cooling Devices*

**45 PIQUETTE AVENUE**

**DETROIT, MICHIGAN**

# Refrigeration Service Engineers' Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.



## THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

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(Continued on page 48)



# TIME...

## ... the test of VALUE

**T**HERE ARE many ways of determining values, but Time, the element that nothing can escape, is the true test of the quality of any product.

How well the product is made is discovered only after it is tested against the length of time it will operate efficiently without servicing.

This is the reason why Chieftain Compressors and Refrigeration units have been so widely accepted by men who know what to expect of the units they use. They know Chieftain's reputation for consistently manufacturing units that give years of trouble-free performance.

It is this recognition of Chieftain's reputation for quality products that causes leading manufacturers to "Standardize on Chieftain."

*Remember:* Before you decide on your postwar program, first investigate Chieftain.



# Chieftain

**TECUMSEH  
PRODUCTS CO.  
TECUMSEH • MICHIGAN**

(Continued from page 46)

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## R.S.E.S. Chapter Notes

### CENTRAL CONNECTICUT CHAPTER

While the Central Connecticut Chapter has not been mentioned recently within these columns, it is just turning its third season and is still going strong. Located in Hartford, Conn., in the heart of a boom town, the members have their hands full trying to keep the service situation under control. With many of its members engaged in defense work, a real burden has been placed on those actively engaged in service.

The Chapter has also lost a number of its members to the armed forces, and in memory of these, an honorary roll has been created. Those contained on the roll at the present time are as follows: P. A. Wentworth, Navy; J. Bagley, Army; Leon Morin, Army; Leo Helinski, Army; J. E. Wilkinson, U.S.N.R.; Howard Bidwell, U.S.C.R. The Chapter wishes these men a speedy and victorious return.

Another disturbing, or rather diverting activity encountered by the Chapter this year was the passing of a refrigeration ordinance by the building department of Hartford. This ordinance required each service man to pay a \$25.00 license fee if in business, and each employee to pay a \$5.00 license. Because this code was passed without publicity, or without the knowledge of a large percentage of refrigeration men, it came as a complete surprise, causing considerable confusion. It was passed as a law, however, and had to be abided by. This did not prevent the Chapter from investigating and immediately endeavoring to obtain some changes or amendments which would make the code more workable to the average service engineer.

Gas shortage has made it difficult to hold meetings with the exception of strictly business meetings by the officers only, but in spite of this fact, the Chapter recently received five new members to its ranks.

### TWIN CITIES CHAPTER

*August 3*—The first order of business for the evening was a report from the treasurer and the reading of the minutes from the last meeting. New applications were received and accepted from Roger Frank, Ubert Hansen, George Bartlett, Tillman Larson and Richard Frank.

Art Palen reported on his discussions with the war manpower commission stating that the attitude of the board was much in favor of obtaining deferments for refrigeration service men. Jack Ehlers stated that he believed the draft boards had already received orders to defer men until September 30. Ed Fleming was called on to provide information on licensing refrigeration men. He reported that a city ordinance is to be drawn up and he suggested that the members help him to draw up the defense of this ordinance. Some discussion followed with a number of questions asked Mr. Fleming, which he answered to the best of his ability. The latter part of the meeting was thrown open to an open discussion of problems encountered in the field.

### KANSAS CITY CHAPTER

*June 10*—The meeting was called to order by President R. E. Meeker. Leo E. Stodgell, Sr. was welcomed as a new member. A report on the dinner furnished by the losing membership team to the winning team indicated that a very good time was enjoyed by everyone, and that the dinner was an excellent one. On the educational meeting, Mr. Meeker read a bulletin pertaining to the allocation of Freon, and considerable discussion on the Freon situation followed. Mr. Visger read an interesting article entitled "Glass Goes to Town."

### DAYTON CHAPTER

The Dayton Chapter has held regular meetings once a month during the past summer season. Meetings are usually held on the second Thursday of each month. Attendance has been good for the summer months and the discussions have been mostly relating to present conditions and latest government orders. On July 25, the Chapter held its second annual picnic. It was a very nice day and the attendance was good. Quantities of ice cream, beer and other refreshments were consumed, and everyone seemed to have an enjoyable time.

### MILE HIGH CHAPTER

*August 9*—A counting of noses showed there were 21 members present with two visitors. These visitors were Mr. Ray Polley of Ansul Chemical Co., and Mr. Allen of the Ilg Heating & Ventilating Co. The application of Gerald Holtzinger was read and accepted, and Gerald was welcomed to the Chapter as a member.



A motion was passed and the treasurer instructed to pay the dues of all members of the Chapter now in the armed services.

Harvey Olmstead provided an educational diversion with an explanation of the difference in wire sizes for electrical applications. With the aid of formulas, he showed how electrical costs would go up or down, depending on the size of the wire used. His talk and diagrams were most interesting and educational.

Mr. Olmstead then introduced Mr. Allen, who gave an interesting talk on ventilation and the different types of fans and blowers employed. He explained several different types of ventilating systems, and his talk proved extremely interesting.

Ray Polley of Ansul Chemical Co. received a barrage of "When are we going to get some Freon" questions, under which he stood up extremely well. It was with regret, however, that he informed the Chapter that he could give them little concrete information at the present time because large quantities of the refrigerant was being used by the army.

Mr. McCombs gave a resume of the latest priority orders and led some discussion on the subject. Refreshments were served following the meeting.

#### WORCESTER CHAPTER

*August 17*—The second summer meeting was held by invitation at the home of Bill Tierney. The host gave the boys the "invite"—then sat back and relaxed while Mrs. Tierney treated the boys to a fine list of vitamin packages from her Victory Garden. Attendance was up 25 per cent for this meeting, not because of the promised outdoor feast, but because they are interested in the educational affairs of their chapter.

Dimout regulations in this area drove the boys inside at dusk for the monthly meeting. Maybe the winter meetings are dull because the boys are hungry, but this time, all were in the best oratorical array.

The most important item was the discussion of the plans for the Massachusetts state convention to be held this fall. General Chairman, Robert N. Davis, outlined tentative plans for the convention and welcomed suggestions from the floor, but no one saw him writing down any of them in his little book. Another Worcesterite to the Armed Services, George Nogler, sent word that he has gone on a service call for his "Uncle." Good luck, George, and don't forget to write.

#### MADISON CHAPTER

*August 18*—A special meeting was held by the Chapter on this day for the purpose of electing new officers. Those elected were as follows: *President*, A. L. Robertson; *Vice President*, James A. Hughs; *Secretary*, Fred Barney; *Treasurer*, Vincent Sweeney; *Sergeant-at-Arms*, H. Forrest Pemberton.

It was decided to retain the second Thursday of each month as the regular meeting night. A discussion on the annual Wisconsin state picnic brought a decision to hold the picnic on September 19. Invitations are to be mailed as soon as printed. Vince Sweeney was appointed Chairman of the committee to handle all arrangements.

Dear Fellow Worker:

The Wisconsin R.S.E.S. Association extends to you and your family an invitation to attend the sixth annual state picnic to be held in Tenny Park at Madison, Wisconsin. The date, Sunday, September 19.

Each family is expected to bring a basket lunch; coffee, pop and ice cream will be served on the grounds. In addition, there will be prizes and a ball game.

Therefore, we are counting on your attendance to help make this affair a huge success. Bring another service man or a friend along if you wish.

Looking forward to seeing you September 19, I remain

Yours very truly,

#### LOS ANGELES CHAPTER

*July 28*—The meeting was called to order at 8:30 p. m. and Mr. Irving immediately appointed Messrs. Kirk and Cox to sell tickets for the defense stamp drawing at the close of the meeting. Messrs. McQuay and Denny reported on their visit to the camp for delinquent boys, and Mr. Roth reported on the dinner committee's activities.

A new educational committee was appointed in the persons of Merle Stutzman, Chairman, with Messrs. Dawson and Caffee assisting. A guest of the evening was John Marquardt of the Los Angeles County Probation Dept. A moving picture was presented by Mr. Wilson entitled "Builders Creed." Pete Askew presented all the latest information on the Freon situation.



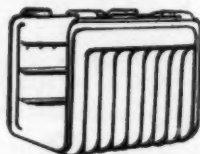
## HERMETIC REBUILDING

One of the largest hermetic rebuilding plants in the United States. Refrigeration units, parts and supplies. General Electric, Westinghouse, Grunow, Majestic and Crosley. Write for catalog on your letterhead.

### WESTINGHOUSE EVAPORATORS

CAN ALSO BE USED FOR OTHER REPLACEMENTS

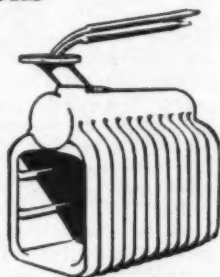
REBUILT  
GUARANTEED



B 122—2 Tray  
B 123—3 Tray

**\$6 75**  
Each

**\$4 95**  
Each



ASD 12—3 Tray  
BSD 12—4 Tray

### FLOATS

WESTINGHOUSE—GIBSON

CAN ALSO BE USED FOR OTHER REPLACEMENTS

REBUILT  
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**\$3 25** Each



No. S-201

*While They Last*



No. S-203

### NOW IN STOCK

FRIGIDAIRE  
REED AND  
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No. PE 18—Mfr. No. 83706

11c Ea.

CROSLY Replacement PARTS



Connecting Rods  
No. 500—\$1.12 Ea.



Discharge valve reed replacement for No. 12453  
No. 502—5c Ea.



Capillary Tubing  
No. 501—\$1.09 Ea.



Suction valve wafer replacement for No. 12391-A  
No. 503—5c Ea.

## Service Parts Company

2511 Lake St., Melrose Park, Ill.

#### MOTOR CITY CHAPTER

The meeting was called to order by President Fortune. One of the first acts of business was to appoint a membership committee consisting of Messrs. Clark, Chairman; Babcock and Dobbs. Three new applications for members were turned over to the committee for investigation. A report of the advertising committee started the discussion by the members on the possibility of inserting an ad in the local newspaper or telephone book; this ad to embody the names and addresses of all members under a R.S.E.S. heading.

A discussion on ways and means of improving attendance brought out the suggestion that the educational program be given more attention. It was also suggested that a question box be placed in every distributor's store for the purpose of gathering questions on service problems. It was thought that if the problems were presented as they arise, it would be easier to obtain these questions than when the men arrived at the meeting and had probably forgotten the problems of the day.

A picnic was held during the summer which was well attended.

#### Ladies Auxiliary

##### TWIN CITIES AUXILIARY

August 3—Mrs. Holmes reported on the proceeds of the Bingo game at the picnic, stating that a profit of \$9.70 was made, which she immediately turned over to the Treasurer. Mr. McCafferty, who provided a financial report of the picnic, thanked the members of the auxiliary who served on the committee and gave them credit for much of the success of the picnic.

Arrangements were started to have a joint weiner roast with the men's Chapter on September 11, the affair to be held at Nokomis Park.

\$\$\$

#### ANNUAL MEETING OF ILLINOIS ASSOCIATION OCT. 16-17

MORE than 150 persons are expected to attend the annual convention of the Illinois Association, R.S.E.S., to be held Saturday and Sunday, October 16 and 17, in the Nelson Hotel, Rockford, Illinois.

According to an announcement by R. C. McCarthy of the Rockford Chapter, the list of speakers, in addition to Herman



**Superior has gone to War!**

- ★ DIAPHRAGM PACKLESS VALVES
- ★ PACKED AND PRESSURE CUP VALVES
- ★ CHECK VALVES AND LIQUID INDICATORS
- ★ DEHYDRATORS AND FILTERS
- ★ MANIFOLDS AND HEAT-EXCHANGERS
- ★ FITTINGS AND ACCESSORIES

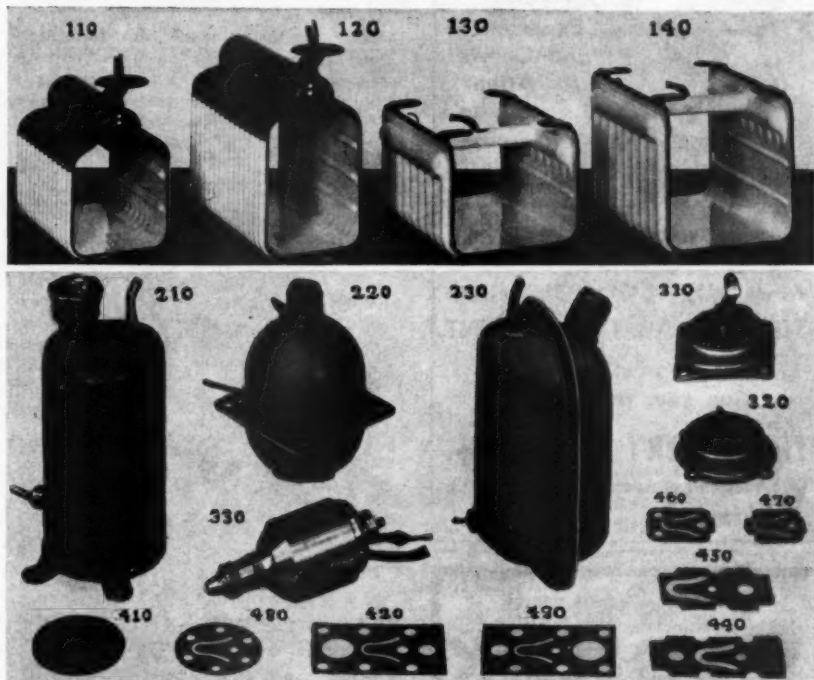
Even though we are working "round the clock" on implements of war, every passing month strengthens our conviction that refrigeration equipment is so vitally essential that we should continue to allocate an increasing percentage of our manufacturing facilities, personnel and planning to our refrigeration products.

**THAT'S OUR POLICY . . .** continuing to do even a better job of supplying, as promptly as conditions will permit, more valves, manifolds, heat exchangers, dehydrators, liquid indicators, fittings and accessories to manufacturers, jobbers, installers and service engineers.

Write for Copy of Catalog R-3

**SUPERIOR VALVE & FITTINGS CO.**  
1509 WEST LIBERTY AVENUE  
PITTSBURGH, PENNSYLVANIA

# FOR SALE! —WHILE THEY LAST— Used Evaporators and High Side Floats



## EVAPORATORS—FLOODED TYPE

- 110—2 Tray Goose Neck.....  
120—3 Tray Goose Neck.....  
130—8½" w. 7½" h. 11½" d.....  
140—8½" w. 9½" h. 11½" d.....

Black, white and combination. On No. 110  
and No. 120 leakproof lines \$2.50 extra

## HIGH SIDE FLOATS

Cleaned and Checked

- 210—For Westinghouse Units..  
220—Ball Type.....  
230—For back of refrigerators..

## USED GENUINE WESTINGHOUSE PARTS IN GOOD CONDITION

- 310—Circuit Breaker.....@.75  
320—Circuit Breaker.....@.75

- 330—Unloader Valve.....\$2.50  
In Good Condition and Tested

- 410—Discharge Valve Plate.....\$1.10  
420—430—440—450—Valves .....@.50  
460—470—480—Valves .....@.35

## Porcelain Evaporators—Refinished Like New

Kelvinator, Gibson and All Others; Leaks Welded, Reporcelained in Blue. We have on hand certain models of evaporators to exchange—no waiting. Send in your old evaporator—Exchange Price, \$12.50 F.O.B. Chicago.

All Prices F. O. B. Chicago, Ill.

**ACME REFRIGERATION PARTS CO.**  
5217 W. Madison St. Telephone  
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SERVICE ENGINEER

## KEY to Our SERVICE



Is Our Long  
Experience  
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Attention to  
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orders  
for

## REFRIGERATION AND AIR CONDITIONING SUPPLIES AND EQUIPMENT

Write for our big catalog,  
on your letterhead

**The HARRY ALTER Co.**

1728 S. Michigan Ave.  
Chicago 16, Ill.

134 Lafayette St.  
New York, N. Y.

USE

## VISOLEAK

Ally yourself with the Industry  
program of CONSERVATION.  
SAVE refrigerant and time.  
SIMPLIFY leak detection prob-  
lems.

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**VISOLEAK** shows you those  
"hard-to-find" leaks, and is suc-  
cessful with all refrigerants. Use  
four fluid ounces plus one ounce for  
each 10 lbs. of refrigerant to treat  
a system.

4 Ounce Size.....	\$ 1.00
8 Ounce Size.....	1.75
1 Pint Size.....	3.00
1 Quart Size.....	5.00
1 Gallon Size.....	16.00

Buy it from your jobber or write direct to

**WESTERN THERMAL EQUIPMENT CO.**  
5141 Angeles Vista Blvd. • Los Angeles 43, Calif.

Goldberg, Chicago, will include several other leading figures in refrigeration. They will talk not only upon refrigeration matters, but also the post-war opportunities of service men.

Plans are being made also for entertainment not only for members, but for non-members and ladies, who are especially urged to attend. Refrigeration men from all parts of the middle west are expected to turn out for the occasion.



Herman Goldberg who will be one of the principal speakers at the Illinois Association meeting.

§ § §

## DISTRIBUTOR PROVES "CUSTOMER-HELPS" PLAN POPULAR

**H**OW an enterprising wholesale parts distributor can help its customers through the maze of priority red tape and other Government restrictions is being demonstrated in a big way by Airo Supply Company, 2732 N. Ashland Ave., Chicago 14, Ill., now under the managership of L. C. Keely.

Airo's "Customer-Help" program is one of Mr. Keely's pet ideas originated expressly for over-the-counter, as well as out-of-town customers, who would welcome intelligent help when faced with the problems of substitutions, ratings, restriction, and what not. Looking at the whole thing from his customers' standpoint, the Airo manager concluded that it doesn't help a serviceman much simply to tell him that what he wants or needs to do business with is no longer made or is unavailable. Reasoned Mr. Keely, why not help the fellow by suggesting available substitutes or any other way that will help him do his job?

To better render such helpful service, Airo augmented its organization by employing

## COMPLETE STOCKS

TRY US FOR—

Thermo Valves  
Dehydrators  
Copper Sweat Fittings  
Brass Flared Fittings  
Dayton Belts

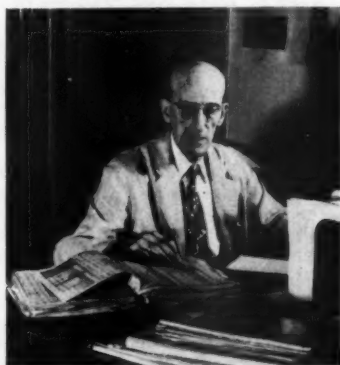
Thermostats  
Gauges  
Thermometers  
Copper Tubing  
All Refrigerants

Send for our catalog

Water Valves  
Tools—Air Filters  
Welding Fittings  
Hermetic Kits  
Refrigerant Oils, etc.

**FRED C. KRAMER COMPANY**  
212 N. Jefferson St. CHICAGO 6, ILLINOIS

Mr. F. A. Roberts, recognized as a foremost refrigeration and air conditioning engineer and designer, who since the war has made a keen study of the serviceman's problems. Because of Mr. Roberts' long experience in the field and firsthand familiarity with service and installation work, he has been of great help to many Airo customers by suggesting solutions to vexing problems.



F. A. Roberts, Airo Supply Co.,  
Chicago, Ill.

Incidentally, a glance at the background history of Mr. Roberts is a view of some of the most spectacular developments of the industry. For instance, it was he who designed and installed the first mechanical refrigeration for railroad diners. This experiment led to early attempts at whole car air conditioning, and the modern version of railroad air conditioning is based on Mr. Roberts' early findings. He started his career with York, and has been subsequently affiliated with Stover, Frigidaire, and now Airo Supply Company.

In charge of the Chicago firm's stock and warehouse, and assisting Mr. Roberts in the

**JARROW**  
REPLACEMENT  
DOOR GASKETS

• Long life, resilient  
and conform to original specifications.

RECOMMENDED  
BY  
LEADING  
JOBBER

**JARROW PRODUCTS**  
426 North La Salle St.  
Chicago 10, Ill.

**Dayton**  
V-BELTS

FOR ALL LEADING MAKES OF  
HOUSEHOLD APPLIANCES

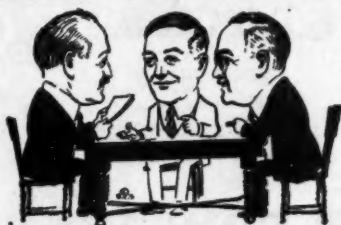
In the interest of conservation, see that  
Victory Vital V-Belts are properly installed with rust-free pulleys in correct alignment and with proper tension.



**THE DAYTON RUBBER MFG. CO.**  
World's Largest Manufacturer of V-Belts  
DAYTON, OHIO

DAYTON RUBBER EXPORT CORP.  
38 Pearl St., New York, N. Y., U.S.A.





## Fewer Men, But More Calls

**H**ERE we see the board of directors of a prominent firm of refrigeration contractors making a discovery.

While the company has lost many men to the military forces and war plants, the number of calls handled has increased. Hence, better profits and more satisfied customers.

Checking up on this mystery, they find that it's all due to



## THE REPLACEMENT GAS for METER-MISERS

When HERVEEN is placed in stock and on the trucks of a refrigeration contractor, call-backs are much reduced.

Tires and gas are conserved, but best of all, precious time is saved. This modern replacement gas is safe, satisfactory and profitable.

Most jobbers stock HERVEEN—but if you're doesn't write direct to

**MODERN GAS CO., Inc.**

*Manufacturers and Refiners*  
1084 Bedford Ave., Brooklyn 5, N.Y.

"Customer-Help" program is Richard E. Nelson. Like Mr. Roberts, he too, has a long experience in the field and does much to relieve the priority headaches of customers of the firm.

According to Mr. Keely, the general situation in the repair and replacement parts end of the business is "easing off" and shipments are being received regularly from many manufacturers. This condition, together with the "Customer-Help" program, is permitting Airo to serve an increasing number of accounts, thus helping servicemen maintain vital refrigeration in their communities.

\*\*\*

## PENN'S SPECIAL RESEARCH LABORATORY MOVED TO GOSHEN

**T**HE special Research Department of the Penn Electric Switch Co., known as the "St. Louis Laboratory," completed its transfer from St. Louis, Mo., to the home plant in Goshen, Ind., on July 30, 1943. Directly supervised by Ralph Penn, treasurer of the company, this Department was founded in November, 1940, for the purpose of conducting research and experimental work on specialized new products.

The particular development work undertaken has been completed and thus the equipment and personnel were moved to Goshen where production on these new controls is already under way. At the present time, these new devices are used for automatically controlling the temperature of both the oil and cooling liquid on Army and Navy airplanes.

According to the manufacturer, the developments have a multitude of temperature applications for the post-war period and they are expected to broaden considerably the company's peacetime markets. Penn Electric Switch Co. manufactures automatic controls for heating, refrigeration, pumps, air compressors and safety controls for internal combustion engines.

\*\*\*

## WEATHERHEAD TELLS WHAT EMPLOYEES ARE DOING IN WAR WORK

**A** NATION-WIDE advertising campaign in 17 large metropolitan newspapers has been undertaken by The Weatherhead Company, Cleveland, manufacturers of fittings, hose assemblies, hydraulic devices and other essential machine parts. The advertisements will tell the general public of the

contribution Weatherhead employees are making toward speeding victory and to urge labor and industry at large to sustain its mammoth war production quotas.

Speaking for the more than 5,000 employees of the company, Albert J. Weatherhead, Jr., president, says in this advertising message:

"Most of us have near relatives in uniform—sons, husbands, brothers—sisters and daughters, too. Our task is not dramatic, but it is vital to every single big weapon. For years we have been making for peacetime purposes the same fittings and devices we are making today. However, responding to the urgent war needs of the nation, we have found ways of producing them in greater quantity than ever before—more than a million every 24 hours! So, you can see, our skill is also one of the great weapons for winning the war and for building the kind of world we're all fighting for."

\*\*\*

#### PENN APPOINTS J. P. BOWEN ATLANTA MANAGER

**JUDSON P. BOWEN**, a native of Georgia, was recently employed by Penn Electric Switch Co., Goshen, Ind., as manager of the Company's Atlanta branch located at 36 Fifth St., N.W. He succeeds N. E. Jennison,



**JUDSON P. BOWEN**  
Penn Electric Switch Co.

former manager, who has been shifted to the factory in Goshen, Ind., to assume new duties in the company's research laboratory. Mr. Bowen has had wide experience in the industry having formerly been with American Radiator, American Blower Co., Georgia Power Co., Kelvinator, Westinghouse, and Larkin Coil Co.

SERVICE ENGINEER



- Check the nameplate of the refrigerator motor. Note the type number or other identification.
- Look up that particular type motor in the up-to-the-minute Aerovox listing. This tells you what exact-duplicate capacitor replacement to use, or, when feasible, what universal replacement can be used. This is the reliable data to go by.
- And best of all, your local Aerovox jobber has a stock of motor-starting capacitors to take care of your requirements, promptly, satisfactorily and profitably to you. Ask for latest Aerovox catalog. Or write us.

**AEROVOX**  
*Capacitors*  
INDIVIDUALLY TESTED

AEROVOX CORP., NEW BEDFORD, MASS., U. S. A.
In Canada: AEROVOX CANADA LTD., HAMILTON, ONT.
Export: 100 VARIC* ST., N. Y. C. • Cable: ARLAB



## Only THAWZONE can get the "hard-to-get" water!

What do you do when water gets "trapped" in a system and can't reach the drier which is anchored far away from the water? You do nothing because you don't know it! BUT—damage is going on, corrosion is taking place—until finally the unit stops and needs tearing down.

The only way to remove "trapped" water is with THAWZONE—the liquid dehydrant which constantly circulates thru the system—hunts down water wherever it is and chemically destroys it without harm to refrigerant, oil or parts.

But the best way is to keep the water out altogether, by using THAWZONE as a preventive. Only  $\frac{1}{8}$  ounce, costing 10c, for each pound of refrigerant, does the trick if used before the unit is installed and running. Use it in every new, reconditioned or repair job before starting up.



150 Refrigeration Supply Jobbers carry THAWZONE in 3 sizes: 1 oz., 4 oz. and pint, in original packages with the Blue, Black and White label.

**HIGHSIDE  
CHEMICALS CO.**  
195 Verona Ave.  
NEWARK 4, N. J.

# THAWZONE

Fully Protected by U. S. Patents

The PIONEER FLUID DEHYDRANT

## PACKLESS FLEXIBLE FASTENER TO PROLONG TUBING LIFE

THERE has been added to the list of vibration absorbers a new device known as the Packless Flexible Fastener which has the combined functions of a supporting strap and a vibration absorber for stationary or movable tubing. It was originated by the engineers of Packless Metal Products Corporation, New Rochelle, N. Y., manufacturers of specialties such as seamless flexible metal hose, detachable self-sealing couplings, self-flaring tube couplings, etc. The fastener was developed at the request of aircraft builders who desired a simplified and improved hose strap that would eliminate the whip of hose in airplane engines.



Packless Flexible Fastener installed.

It consists of a sensitive spring, cone-spiraled and terminating in a clip which snaps on to the tube or similar unit to be fastened—the right size fastener being chosen to fit the O.D. of the unit. The fastener is affixed to a supporting surface by means of standard or wood screw fitted through the cone. Inasmuch as it flexes in all directions, the fastener can be installed in either lateral or vertical position. Its small hose area both facilitates placement and gives a large working area to the cone.

When used to support flexible hose, the Packless Fastener effectively prevents whip and at the same time counteracts "frequency" set up in the flexible tubing. Any rigid strap utilized for this purpose tends to cut flexible hose life approximately in half, besides robbing the hose of the full

benefit to be derived from its flexibility. On the other hand, too loose a strap chafes through the hose and causes premature failure. But the Packless Fastener provides correct support as well as responsive, universal action. Should it be necessary at any time to adjust or disconnect one end of the hose, the fastener also provides convenient elongation or contraction to facilitate this operation, or that of reassembly.

Used with copper tubing, the fastener's free action in all directions prevents crystallizing of the copper such as is induced by rigid metal straps which prevent expansion or contraction (and concentrate all stresses near the couplings). Chafing is caused by too loose a strap. The Packless Fastener gives improved support while efficiently absorbing vibration.

The same advantages hold true for its application to rigid piping. Incidentally, the fastener affords sufficient play to make alignment of the piping easy.

On corners, the fasteners can be systematically set so many inches apart in order to prevent tubing bends from making abrading contact. Upon any impact, the fastener compresses into its cone, thus cushioning the hose against injury.

While designed originally for aircraft use, the Packless Flexible Fastener obviously is just as well adapted to application in the railway, refrigeration and other industries.

\$\$\$

## NEW FREON PLANT

**A** NEW plant addition, which will make possible a 55 per cent increase in the productive capacity for "Freon-12" fluorine refrigerant is announced by Kinetic Chemicals, Inc.

Construction of the addition, authorized by the War Production Board, will start immediately at Carney's Point, N. J., and the new capacity is scheduled to be ready by February 1, 1944. The demand for "Freon" has increased so that this latest and largest plant addition is announced even before a previously authorized increase in capacity has been completed.

"Freon" fluorine compounds are safe for food refrigeration and are applicable to all types of domestic and industrial air-conditioning and refrigeration equipment. These compounds are produced by Kinetic Chemicals, Inc., which is jointly owned by E. I. du Pont de Nemours & Company and General Motors Corporation.



● Idle and surplus inventories of refrigeration parts can now be put to essential use in helping to maintain the nation's huge investment in refrigeration.

We buy outright for cash, usable parts for distribution to over 20,000 refrigeration service-men customers. Let us put your idle inventories to good use—you will then be helping conserve scarce and precious materials.

## The Harry Alter Co.

1728 So. Michigan Ave.  
Chicago 16, Illinois



**WP**

**ELECTRIMATIC  
REGULATING  
VALVES**

•  
**For FREON  
SULPHUR METHYL**  
•

Easy adjustment . . . Simple and durable construction. Available in  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{3}{4}$  inch pipe sizes . . . Ask your jobber for details.

**Electrimatic**

**Automatic Control Valves  
and Regulators**

2100 Indiana Ave., Chicago, Ill.

Healthful Living Through  
**FROZEN FOODS**



## Tomorrow's Promise . . . for Farm Families

FOOD FREEZING right on the farm—with the new **BEN-HUR FARM LOCKER PLANT**—will save time, money, and food for tomorrow's farm family . . . And give them healthful, enjoyable variety at daily meals—farm-grown meats, poultry, game, vegetables and fruits, the year 'round!

This new **BEN-HUR FARM LOCKER PLANT** will be important in your post-war selling plans. Remember it, when "V-Day" comes. It will be ready immediately for peacetime production lines.

.. remember ..

# BEN-HUR

## FARM LOCKER PLANTS

BUY YOUR WAR BONDS today . . . and  
YOUR LOCKER PLANTS after the WAR



*Awarded to*  
**BEN-HUR MFG. CO.**

for outstanding  
achievement in  
War Production.

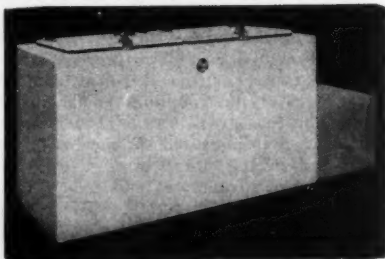
## BEN-HUR MFG. CO.

634 East Keefe Avenue  
Milwaukee 12 Wisconsin

# Continental

FARM LOCKER PLANT

## Saves Food



Although many thousands of our farm locker plants are now in use, you may never have been called to service one.

If you ever are, we want you to know that the factory is sincerely interested in the satisfaction of each and every user. Perhaps we can help with some of your parts problems.

Write for war purchase information

## SANITARY REFRIGERATOR CO.

Fond du Lac, Wisconsin

Model illustrated, No. C-1243. Capacity, 12.5 net cu. ft. Holds up to 600 lbs. of frozen food.



BUY WAR BONDS NOW...  
and  
FARM LOCKER PLANTS  
AFTER THE WAR



## PROMPT SHIPMENT FROM FULL STOCK OF PARTS

That's what we offer. Our customers know we make good.  
We should also like to convince you. Why not try us?

Our South  
Side Branch,  
809 W. 74th  
St., Chicago,  
has a complete  
stock for your  
convenience.

*Automatic*

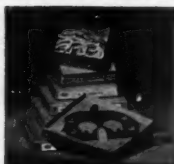
**HEATING & COOLING SUPPLY CO.**

647 WEST LAKE STREET, CHICAGO, ILLINOIS

Send for our  
1943 catalog  
to Dept.  
RS-3.

**GASKETS**

## SPEED VICTORY



Write for complete  
catalog.

• Until Victory is  
won, war orders  
come first. Today,  
our gasket service  
for every refrigeration  
need is helping  
speed war production.  
Under these conditions,  
delays in filling  
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**NEW CATALOGS AND BULLETINS**

THE WEATHERHEAD COMPANY, Cleveland, has issued a special instruction folder detailing installation procedure for Ermeto safety tube and pipe fittings. The folder has four pages printed in red and black with photographs to illustrate each step of the assembly and disassembly of the fittings. An explanation of the way Ermeto works is included. Copies can be obtained by writing to The Weatherhead company, 800 E. 181 Street, Cleveland, Ohio, or to The Weatherhead Co. of Canada Ltd., St. Thomas, Ont.

Another Weatherhead publication is a new catalog supplement in which the diversified products of the company are shown in one publication. The supplement was published for the convenience of engineering, production, designing and purchasing departments.

\$\$\$

SUPERIOR VALVE & FITTINGS CO., 1509 West Liberty Ave., Pittsburgh 26, Pa., has issued a handsome new catalog R2, now available to the trade. The principal feature of the new catalog is that it serves as a guide to Schedule 4 of Limitation Order L-126. The items in the catalog are, unless noted to the contrary, manufactured in conformity with the required specifications for refrigeration valves, fittings, accessories, and other parts as defined in this Schedule and Order. The products featured are diaphragm packless valves up to 1½ in.; diaphragm packless charging, purging and drain valves; wing cap globe valves up to 2½ in.; diaphragm packless hand expansion valves; a line of refillable dehydrators made in accordance with Schedule 4 of L-126; economizers (heat exchangers) up to three ton; and a complete line of fittings. Copies of the catalog are available upon request.

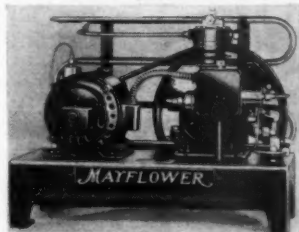
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GENERAL ELECTRIC Appliance & Merchandise department, resin and insulation materials division announces a new 60-page catalog covering the entire line of G.E. insulating materials. The catalog lists and describes hundreds of items including varnished cloths, varnishes, Glyptals, tapes, cords, cotton sleeving, varnished tubings, mica, wedges, soldering materials, cements and compounds.

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